Sunny WebBox

Q: What is the WebBox ?

- The Web Box is an electronic device that provides Data Logging of Inverter parameters and events.

Inverter Sunny Boy

Web Box

Data Logging

Data Logging is the ability to store inverter parameters,channel values and events.

Parameters

No.	Name	Value	Unit
1	Error	-------	
2	Error-Cnt	61	
3	E-Total	2725.9411	kWh
4	Fac	59.99	Hz
5	**h-Total**	**1508.2954**	**h**
6	Iac	14959	mA
7	Ipv	5462	mA
8	Mode	Mpp-Peak	
9	Pac	1780	W
10	Power On	50	
11	Serial Number	1563502821	
12	Vac	119	V
13	Vpv-_PE	0	V
14	Vpv	358	V
15	**Vpv-Setpoint**	**299**	**V**
16	**Zac**	**0.1**	**Ohm**

Events

Time	Type	Source	Category	Message
01/12/2007 3:22:16 PM	Information	WebBox	Communication	Device WR18UW4E:1563502821 comes online
01/12/2007 3:15:52 PM	Information	WebBox	Communication	Device WR18UW4E:1563502821 comes online
01/12/2007 3:15:28 PM	Information	WebBox	Communication	Startup Communication (SMA-COM/COM2/1200;8;N;1)
01/12/2007 2:58:53 PM	Information	WebBox	Security	Installer logged in from PC 192.168.100.83
01/12/2007 2:25:11 PM	Information	WebBox	Security	PC 192.168.100.83 logged out
01/12/2007 2:01:41 PM	Information	WebBox	Security	Installer logged in from PC 192.168.100.83
01/12/2007 1:55:38 PM	Information	WebBox	Portal	Upload of 16227Bytes in 1202ms
01/12/2007 1:55:34 PM	Information	WebBox	Portal	Update WAN-IP:67.118.221.94
01/12/2007 1:41:17 PM	Information	WebBox	Communication	Startup Communication (SMA-COM/COM2/1200;8;N;1)
01/12/2007 1:40:56 PM	Information	WebBox	System	WebBox Startup
01/12/2007 1:40:26 PM	Information	WebBox	System	WebBox Shutdown
01/12/2007 1:38:38 PM	Information	WebBox	Security	Installer logged in from PC 192.168.100.83
01/12/2007 1:30:59 PM	Information	WebBox	Security	PC 192.168.100.83 logged out
01/12/2007 1:20:51 PM	Information	WebBox	Security	Installer logged in from PC 192.168.100.83
01/12/2007 12:55:17 PM	Information	WebBox	Security	PC 192.168.100.83 logged out

Q: Do I have to have a computer connected to the Web Box all the time to make it store the inverter data ?

- No, the Web Box does not need a computer to store the data from the inverter. The Web Box stores the data by itself.

Inverter Sunny Boy in the Garage

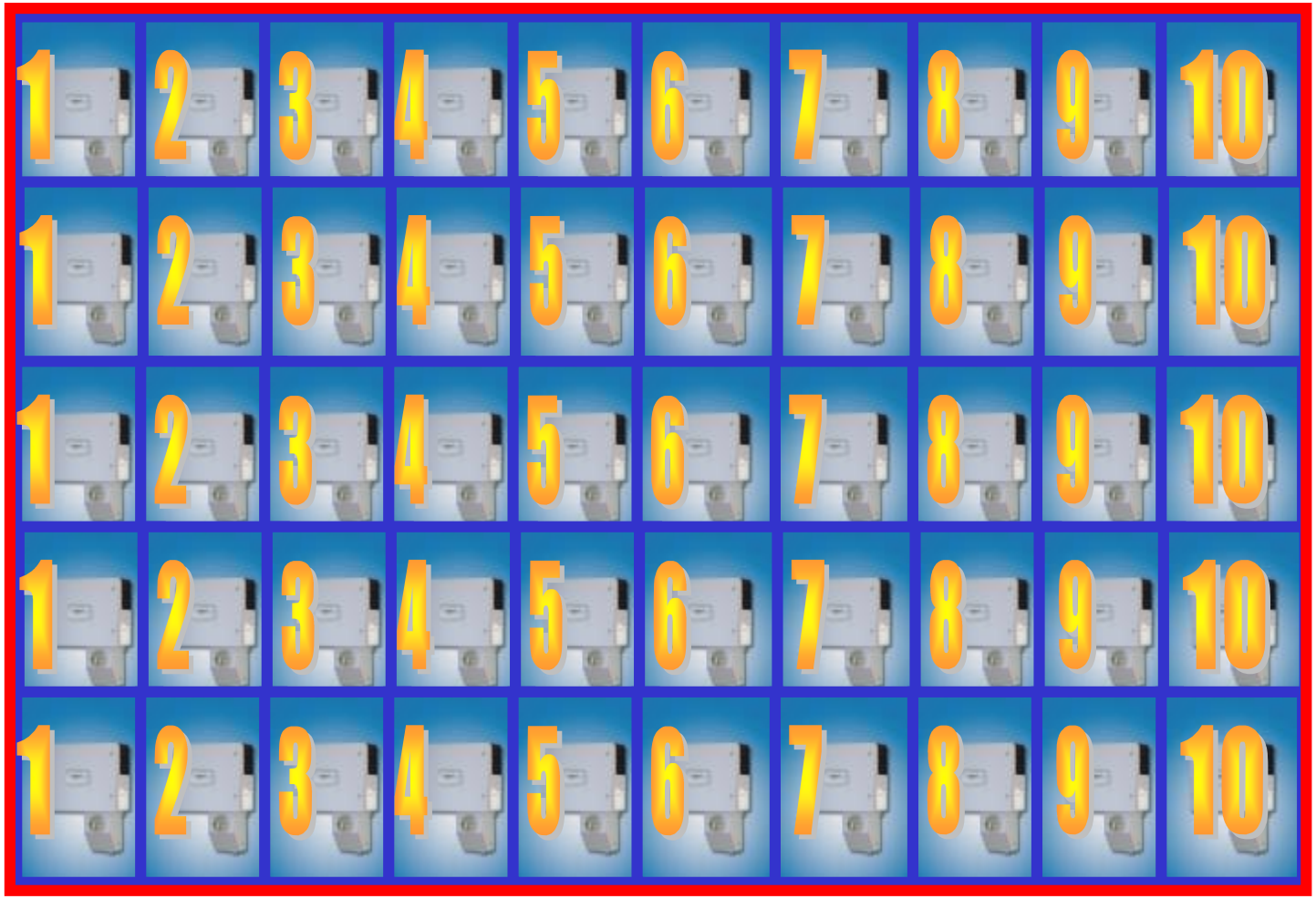
Web Box in the Garage

Power Supply

120 VAC outlet

Q: How many inverters can I monitor with one Web Box ?

- Each Web Box can monitor Up to 50 (FIFTY) inverters.



One Web Box

Where does the Web Box store data?

1) In the internal memory :

8 Megabytes or 3 Months worth of One Inverter Data

Where does the Web Box store data?

2) In the external SD Card Memory.

64 Megabytes 2 years for One Inverter

128 Megabytes 4 years for One Inverter

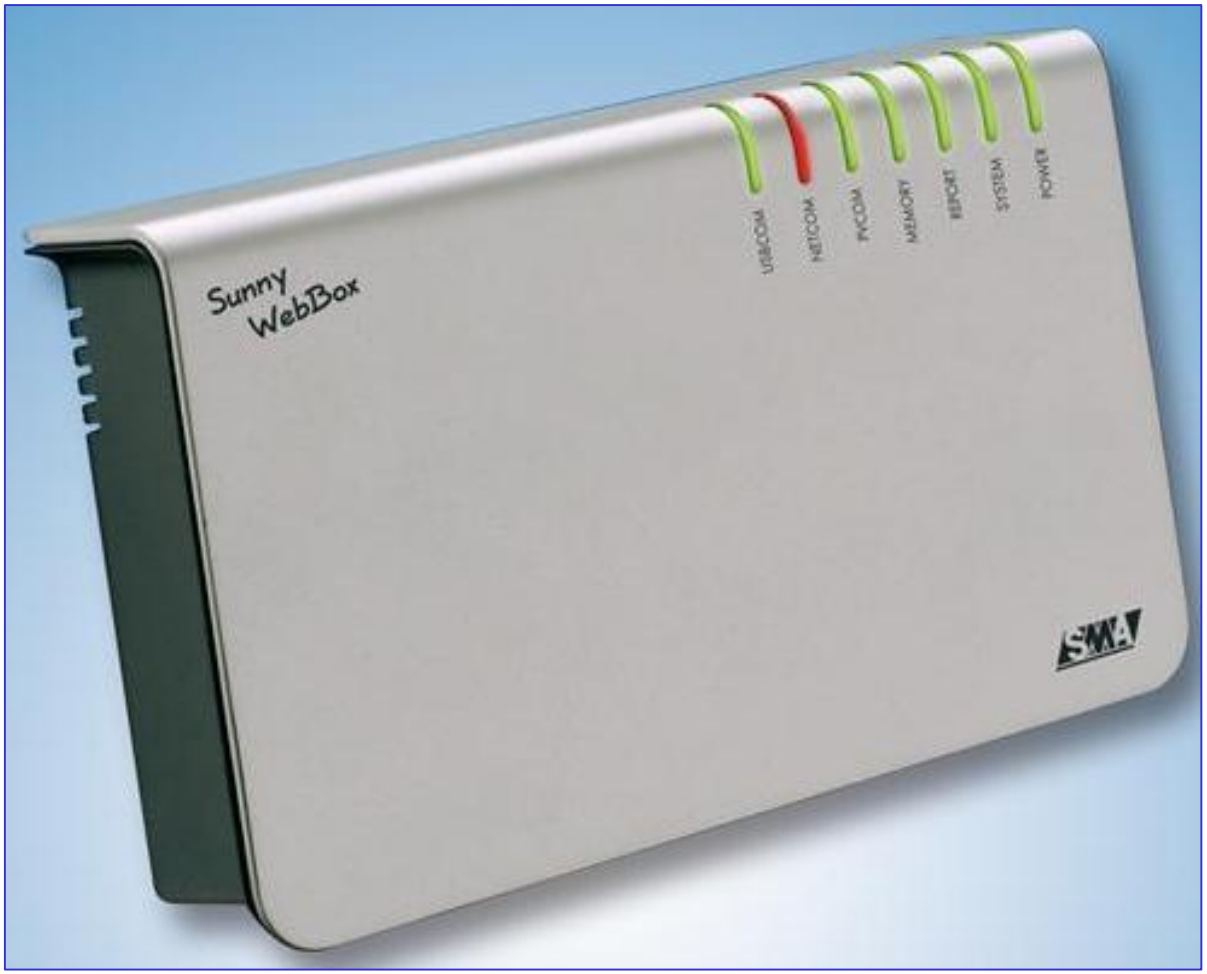
256 Megabytes 8 Years for One Inverter

512 Megabytes 15 Years for One Inverter

Location of the SD Card Memory Slot

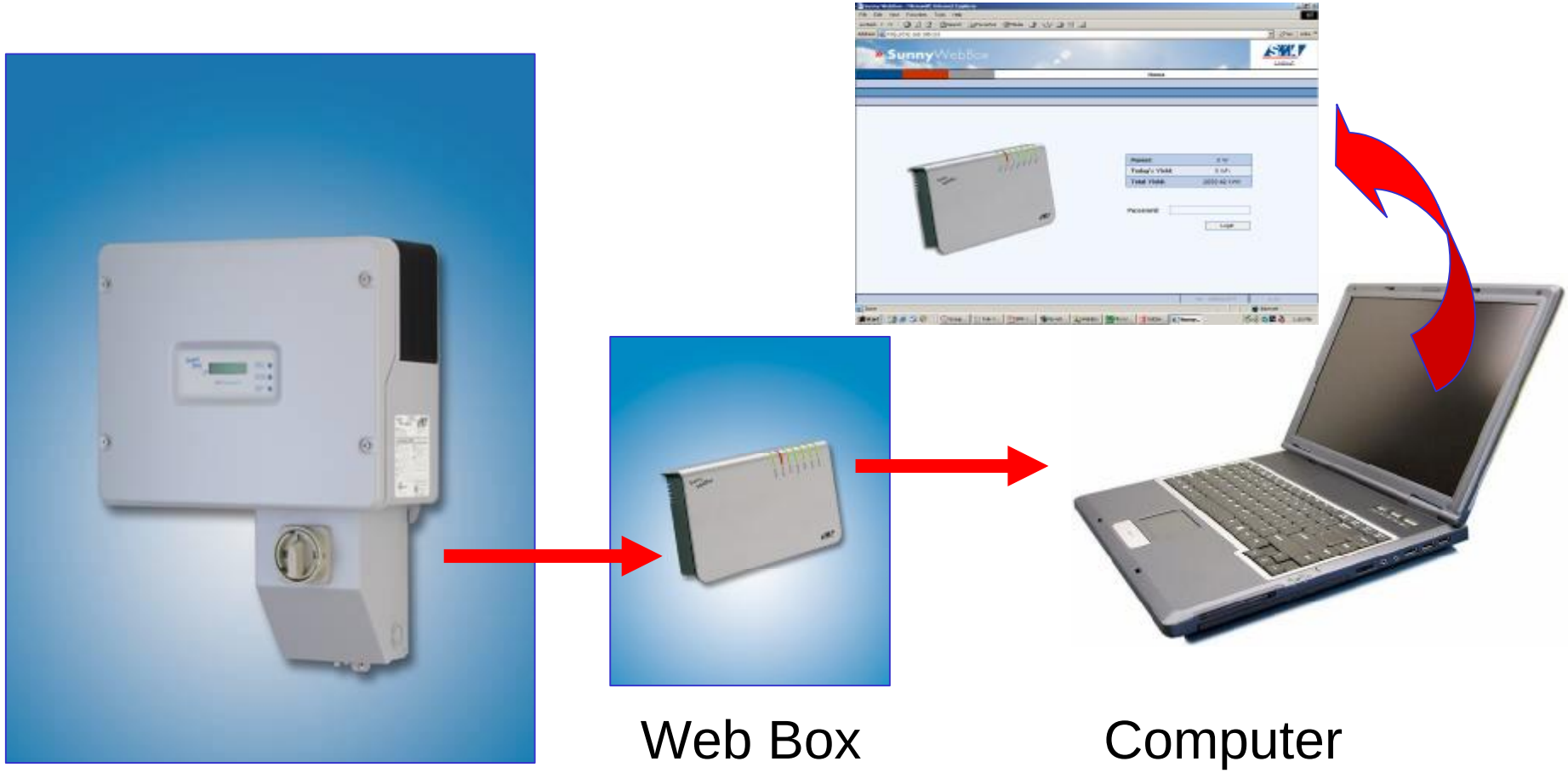
Does the Web Box have a Display ?

- No, the Web Box does not have a display.



How can I see the inverter data ?

- Using a computer or computer device that has a Web Browser.



Inverter Sunny Boy

Web Box

Computer

Q: Do I have to connect the computer to the Internet ?

- No, the computer does not have to be connected to the Internet.

Inverter Sunny Boy

Web Box

Computer not connected to the Internet

Q: Do I have to have a special software ?

- No, the software is any Web Browser like Internet Explorer.

Inverter
Sunny Boy

Web Box

Computer not
connected to
the Internet

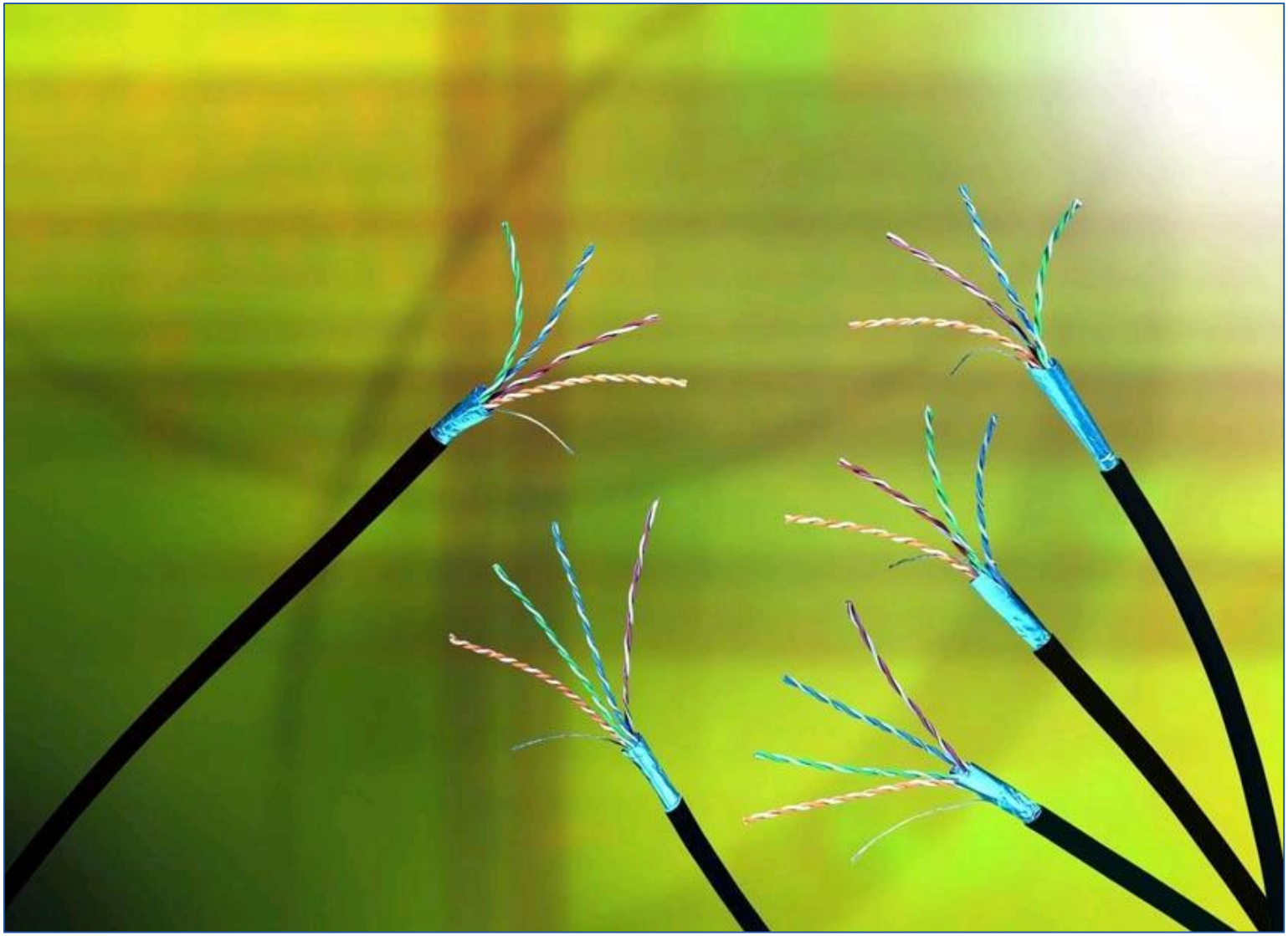
List of parts included in the WebBox package

- A Sunny WebBox
- B Plug-in power supply with adaptors
- C Red Ethernet cable (patch cable)
- D Blue Ethernet cable (crossover cable)
- E Screwdriver
- F Male RS-485 Connector
- G Jumper for SMACOM (10 units)
- H Screws and drywall anchors
- I User manual
- J Mounting template

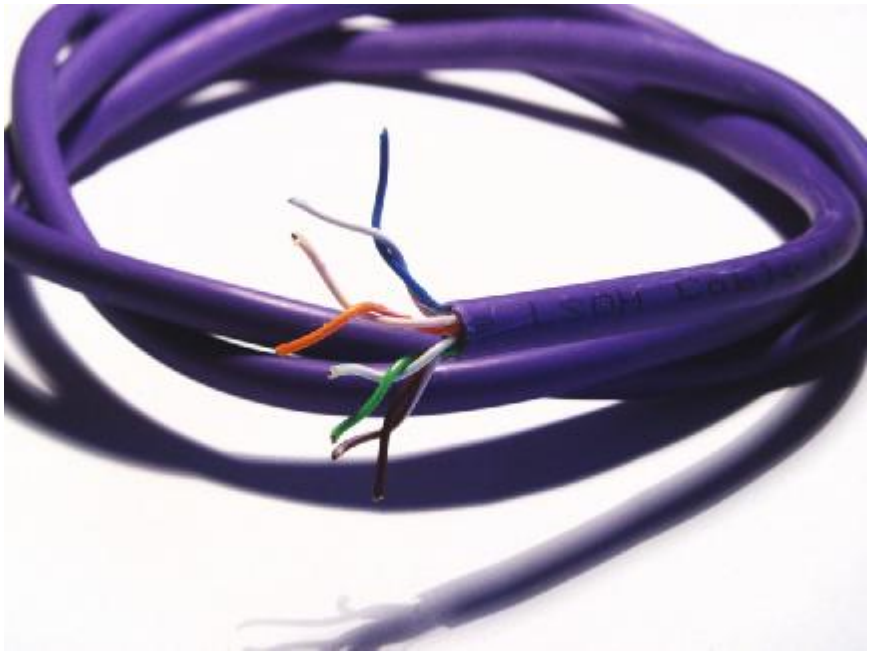
Connectors in the back of the Web Box

RS-485 communication

RS-485 shielded twisted pair cable



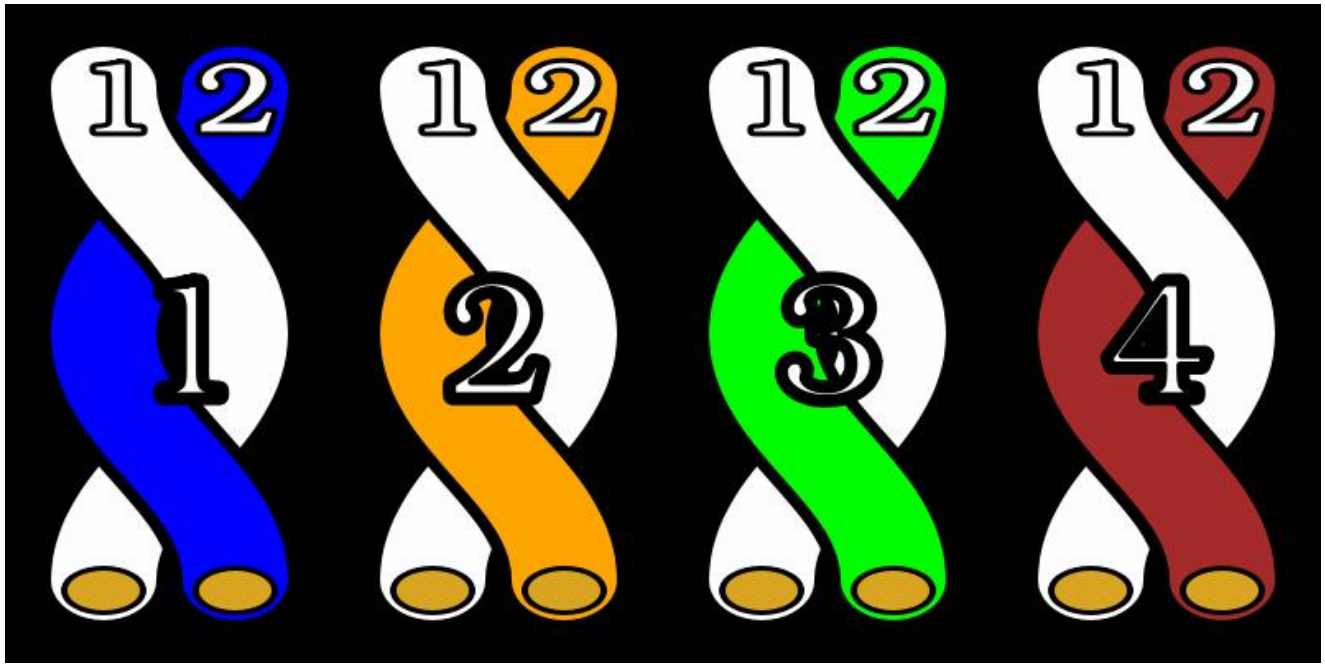
RS-485 cables



CAT 5 Cable

Shielded Foiled Twisted Pair

RS-485 cable twisted pairs

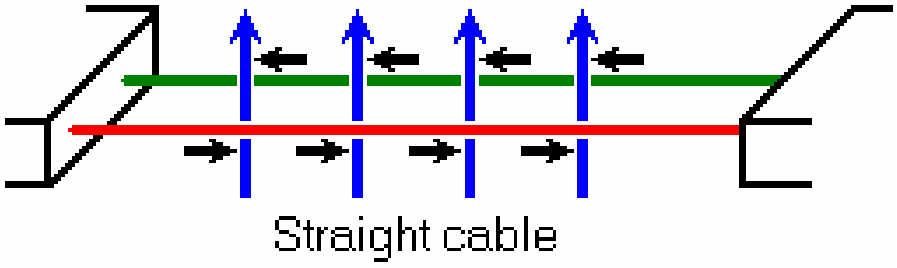


Twisted pair benefits

Reduces or eliminates :

. Electromagnetic Interference from external sources.

. Cross Talk between pairs.



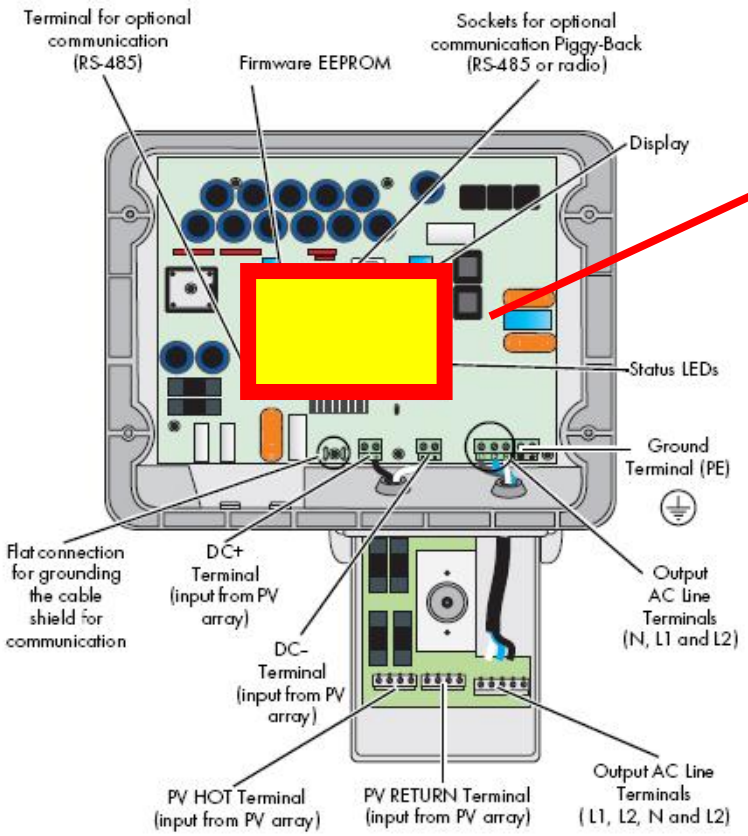
List of parts for one inverter

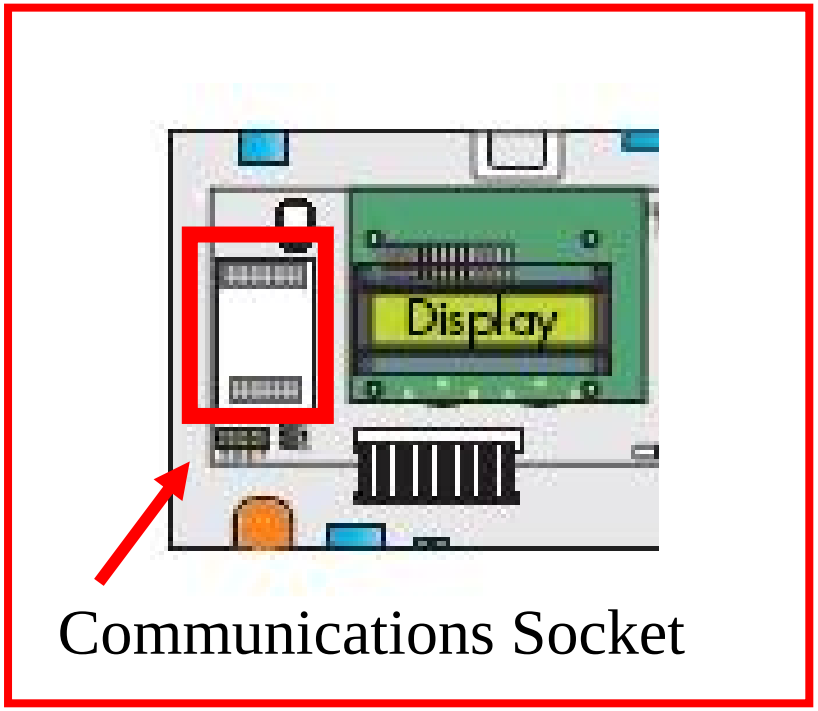
1) One RS- 485 Piggy Back Card

2) One RS-485 Cable

3) One Web Box

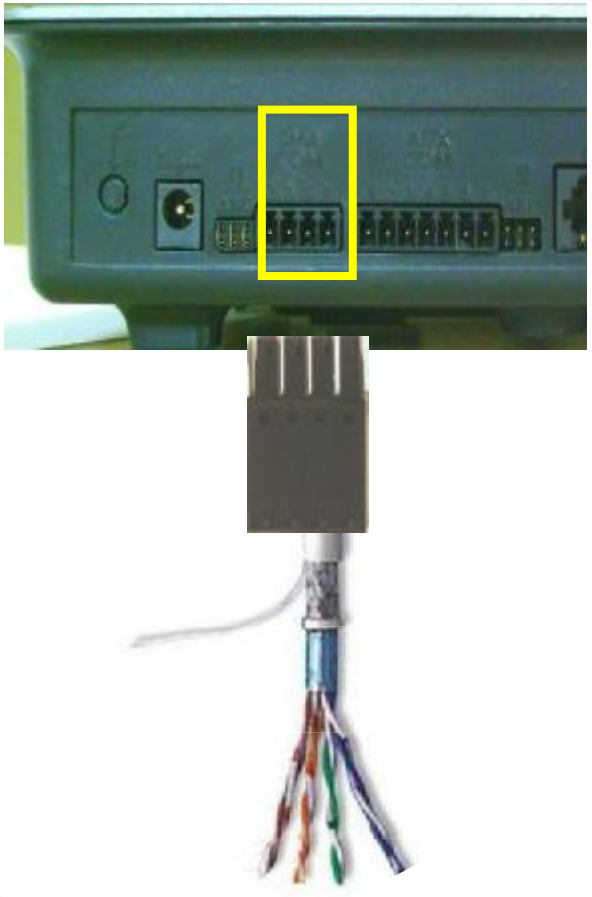
Location of Communications Socket


Terminal for optional communication (RS-485)
Firmware EEPROM
Sockets for optional communication Piggy-Back (RS-485 or radio)
Display
Status LEDs
Ground Terminal (PE)
Flat connection for grounding the cable shield for communication
DC+ Terminal (input from PV array)
DC- Terminal (input from PV array)
Output AC line Terminals (N, L1 and L2)
PV HOT Terminal (input from PV array)
PV RETURN Terminal (input from PV array)
Output AC Line Terminals (L1, L2, N and L2)

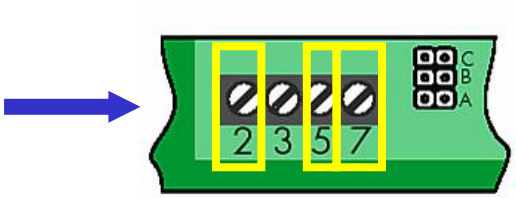


RS-485 Piggy Back Card

RS- 485 Connections from a single inverter to the Web Box



RS-485 Terminal Strip inside the Inverter at the bottom of the RS 485 Piggy Back Card.

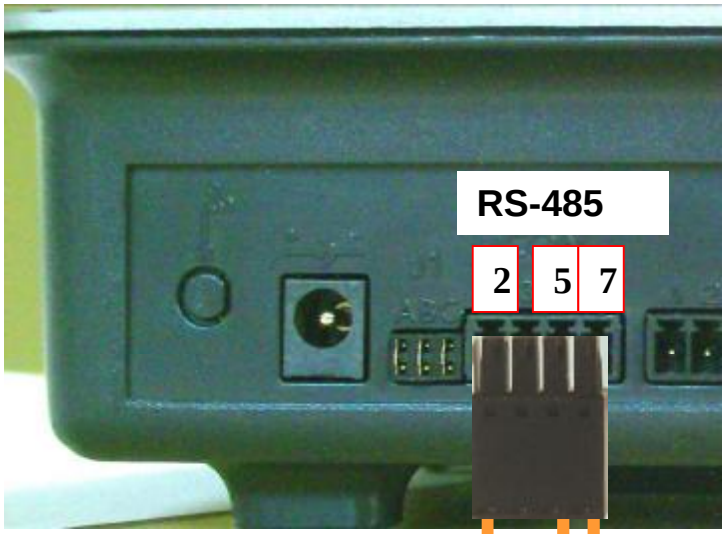


Inverter

RS-485 Piggy Back Card

Terminal Strip

Web Box



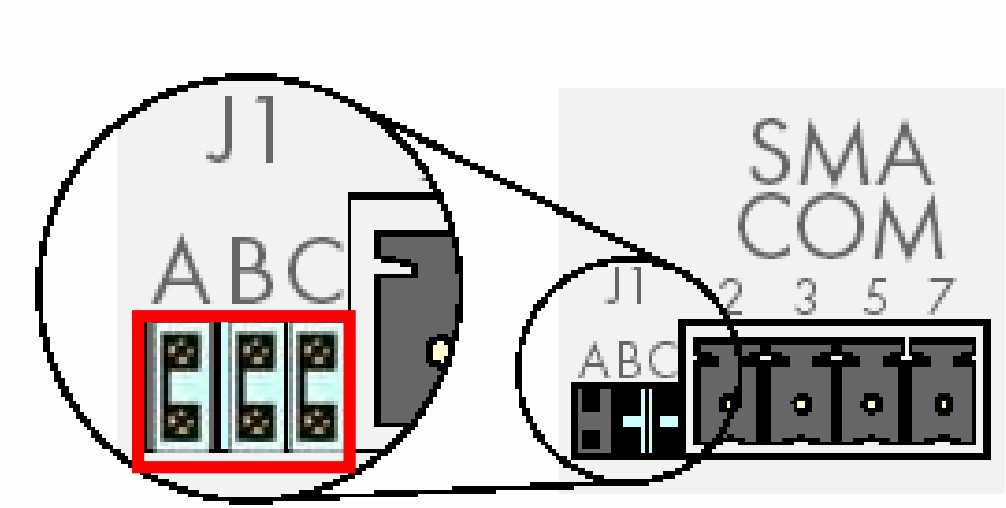
2

5

7

Maximum 3600 feet

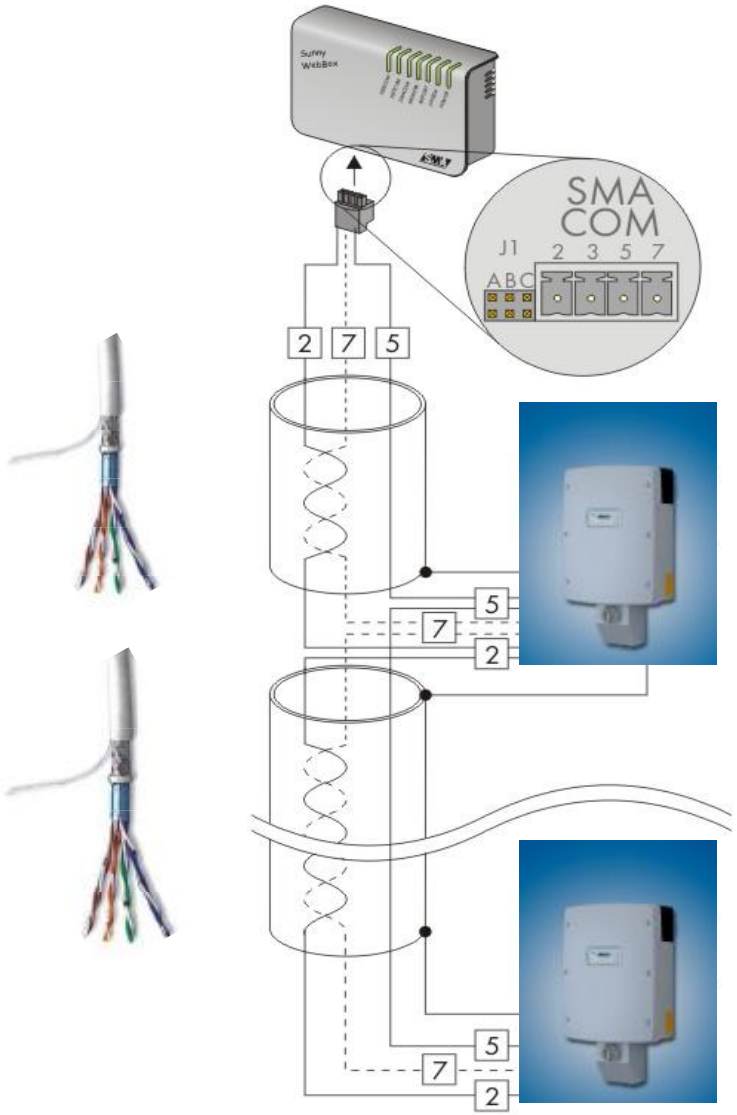
Jumpers



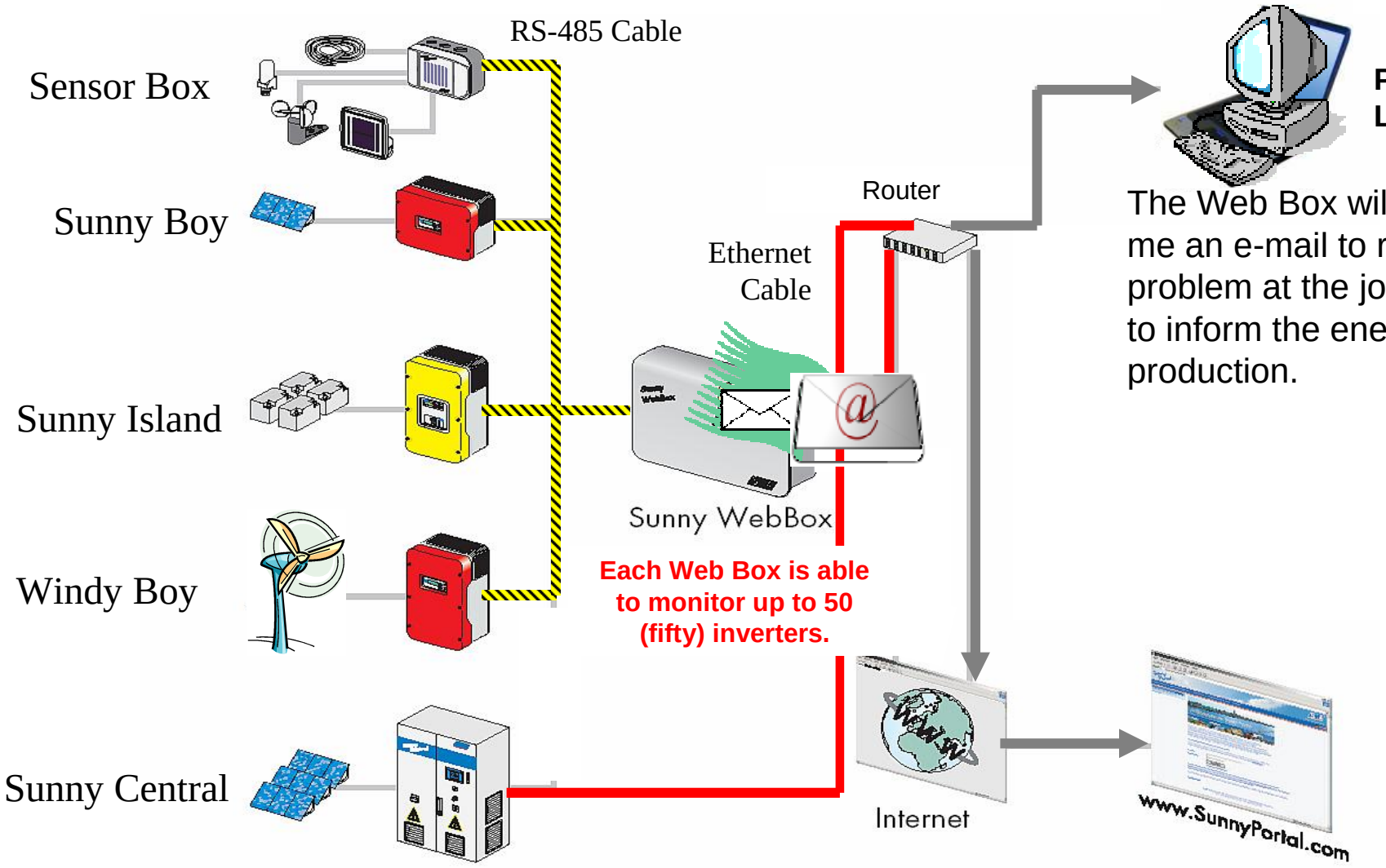
All three Jumpers have to be mounted

	Jumper A	Jumper B	Jumper C

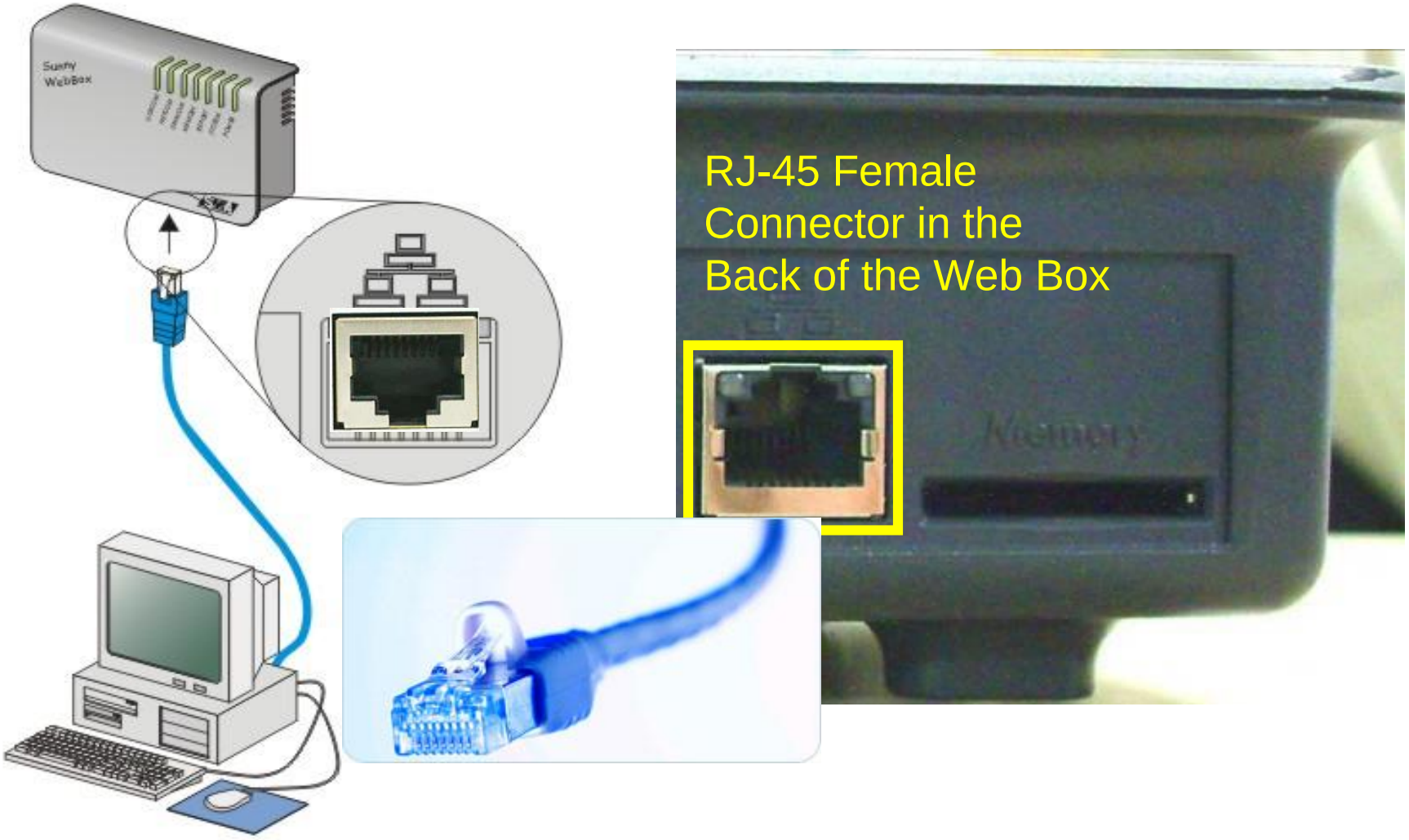
RS- 485 Connections from multiple inverters to the Web Box



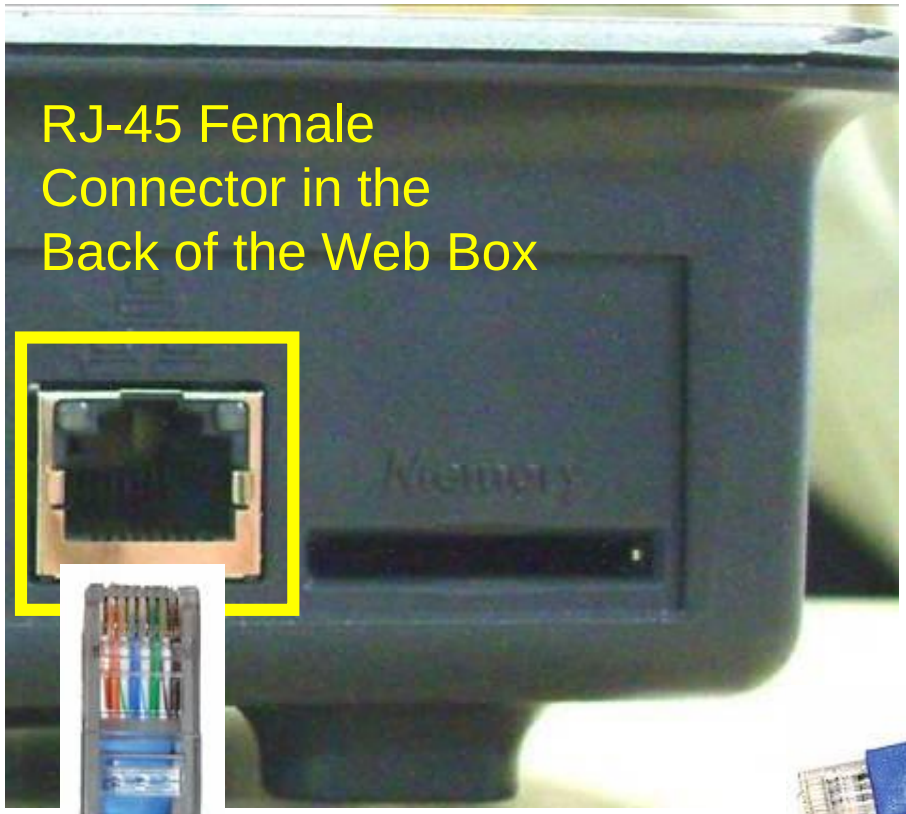
WebBox connectivity

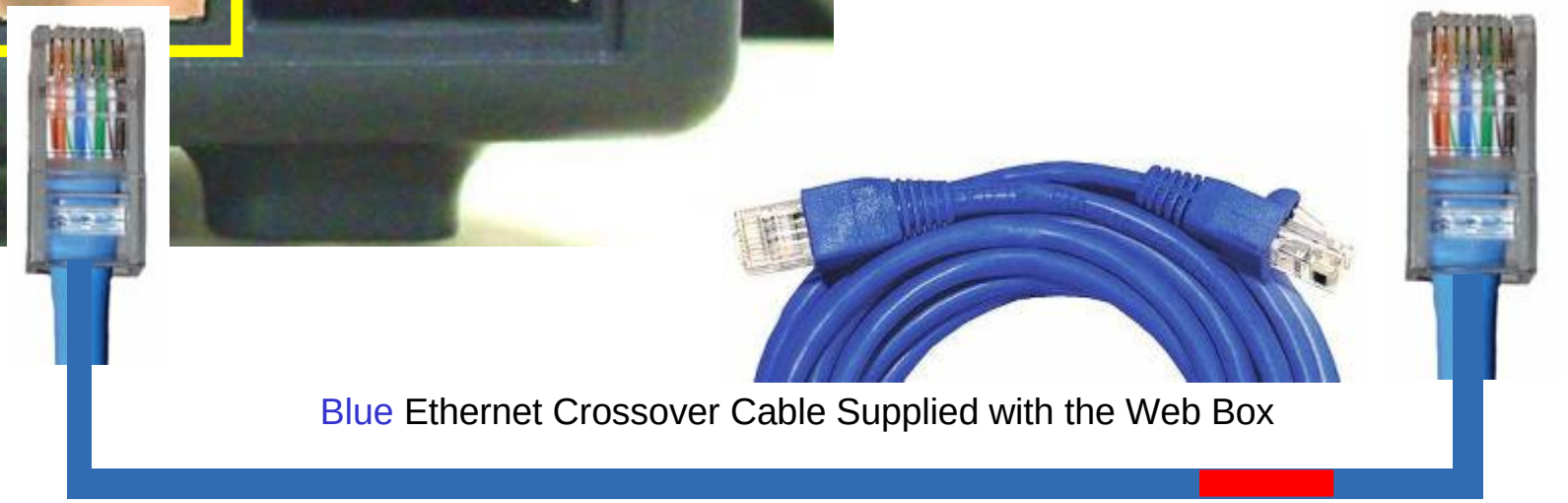


Sunny Web Box Ethernet Connection to a PC or Laptop



Connecting the Blue Ethernet Cable between the Web Box and a PC or Laptop

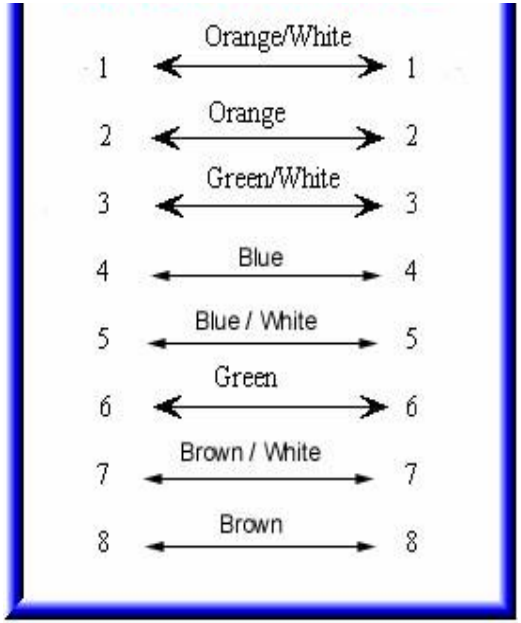




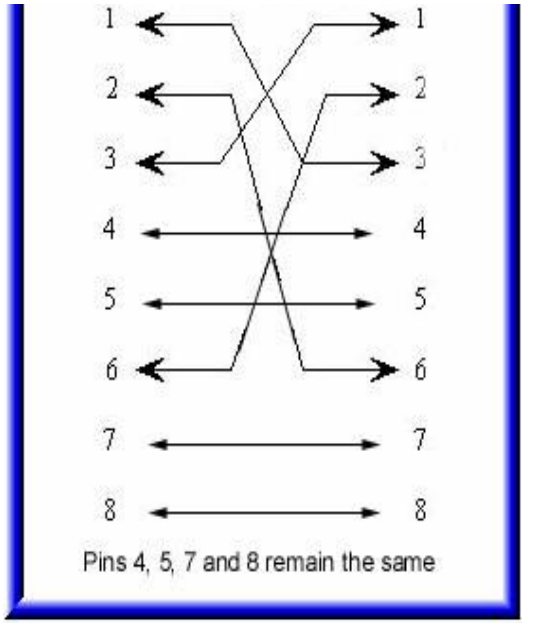
Blue Ethernet Crossover Cable Supplied with the Web Box

Crossover Cable Vs. Patch Cable

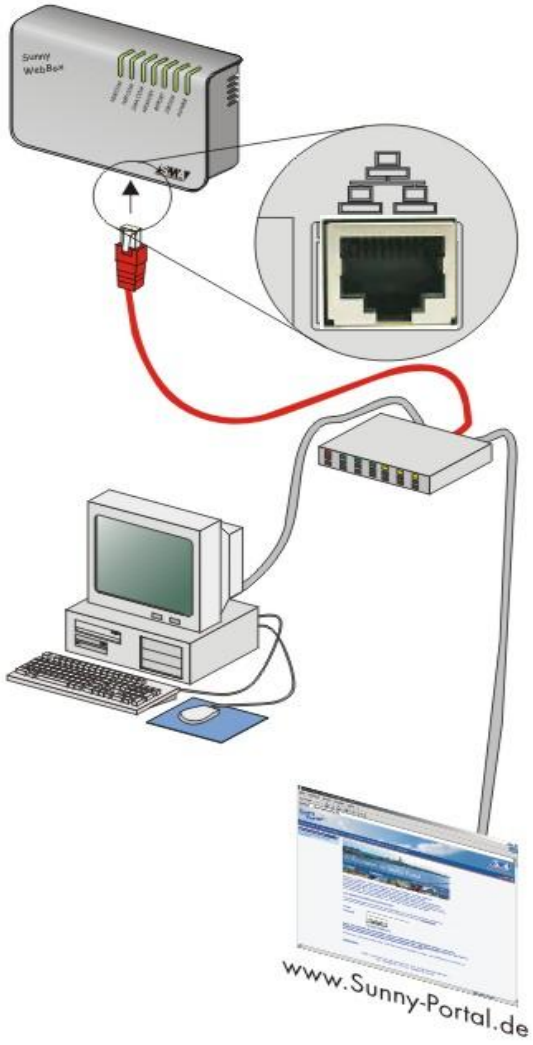
Patch Cable
Used to connect the WebBox to a Router.



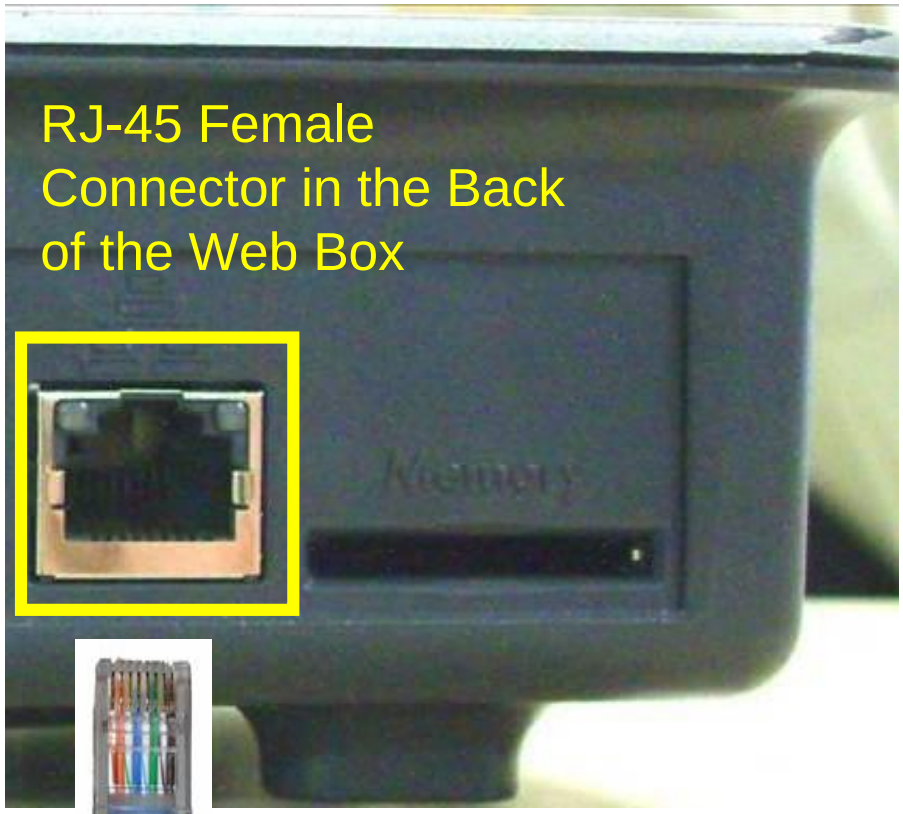
Cross-Over Cable
Used to connect the WebBox directly to a Computer.

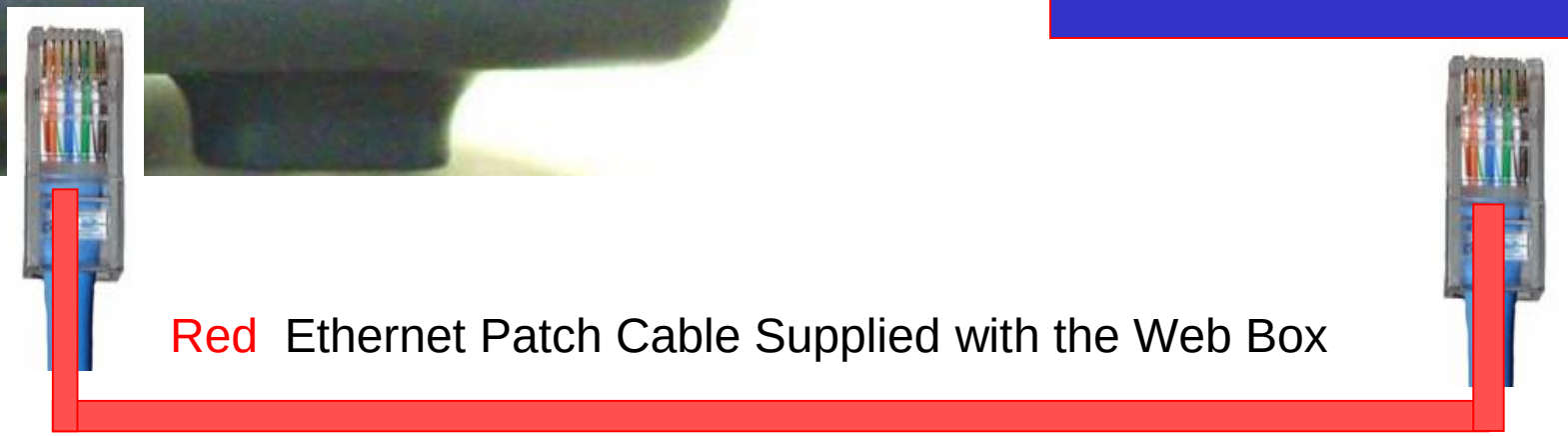


Red Ethernet Cable from the Web Box to the Router

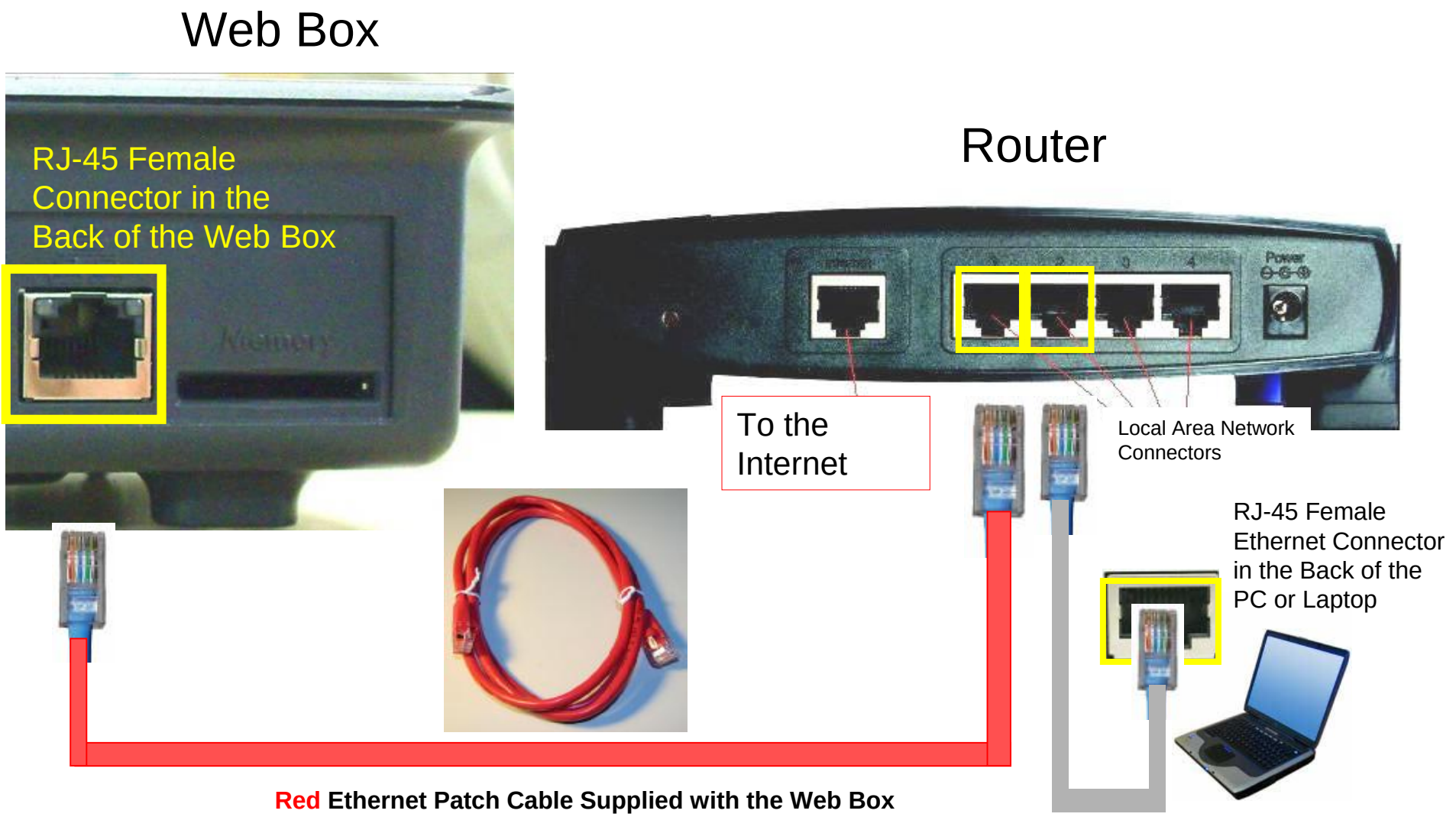


Connecting the Red Ethernet Patch Cable between the Web Box and the Router





Web Box and Computer connected to the Router


Web Box
RJ-45 Female Connector in the Back of the Web Box
Router
To the Internet
Local Area Network Connectors
RJ-45 Female Ethernet Connector in the Back of the PC or Laptop
Red Ethernet Patch Cable Supplied with the Web Box

Connecting a WebBox to the computer via a Wireless Router

Inverter

e

Talking to the Web Box

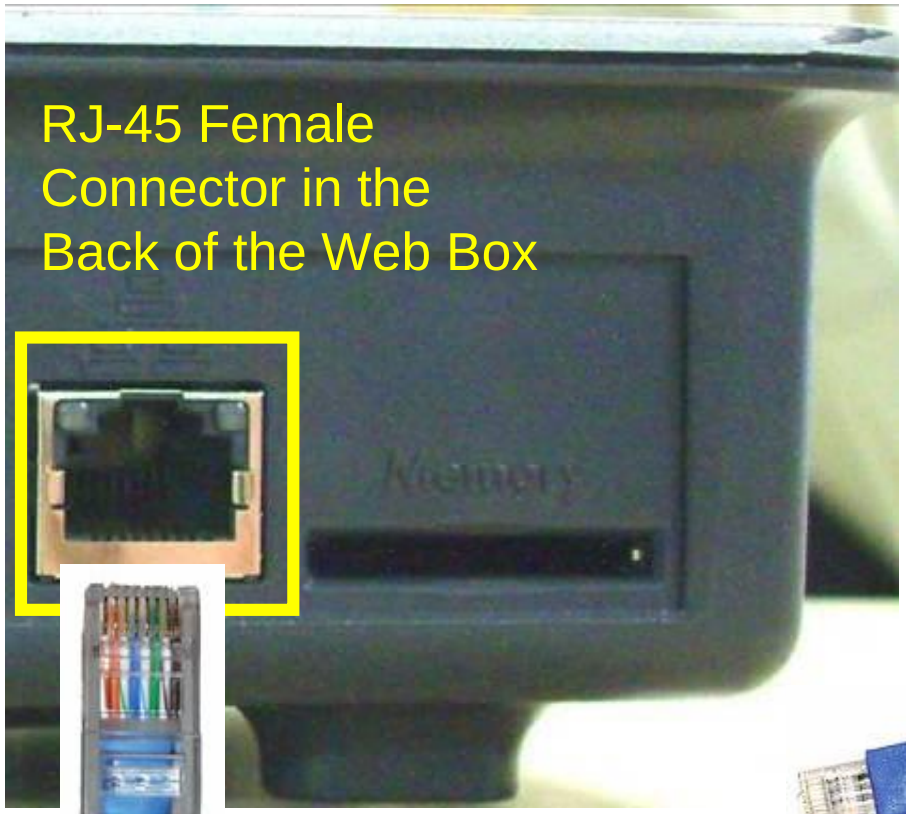
How do I talk to the Web Box ?

- To be able to talk to the Web Box we have to:

1) Connect the computer directly to the Web Box using the Blue Crossover Cable.
2) Set the IP address of the computer so it is in the same range of the Web Box.

Connecting the Web Box directly to the computer

Connecting the Web Box directly to the computer



Blue Ethernet Crossover Cable Supplied with the Web Box

What is the IP Address?

The **IP address** (**Internet Protocol address**) is a unique address used by electronic devices to identify and communicate with each other on a computer network.

To communicate the Computer with the Web Box we have to set the Computer IP address in the same IP address range (in the same neighborhood) of the Web Box.

IP Address

- An IP address is a 32 bit binary number usually represented as 4 decimal values, each representing 8 bits, in the range 0 to 255 (known as octets) separated by decimal points. This is known as "dotted decimal" notation. For example:

140. 179 . 220. 200

10001100 . 10110011. 11011100. 11001000

NNNNNNNN. NNNNNNNN. NNNNNNNN. CCCCCCCC

Web Box Default IP Address

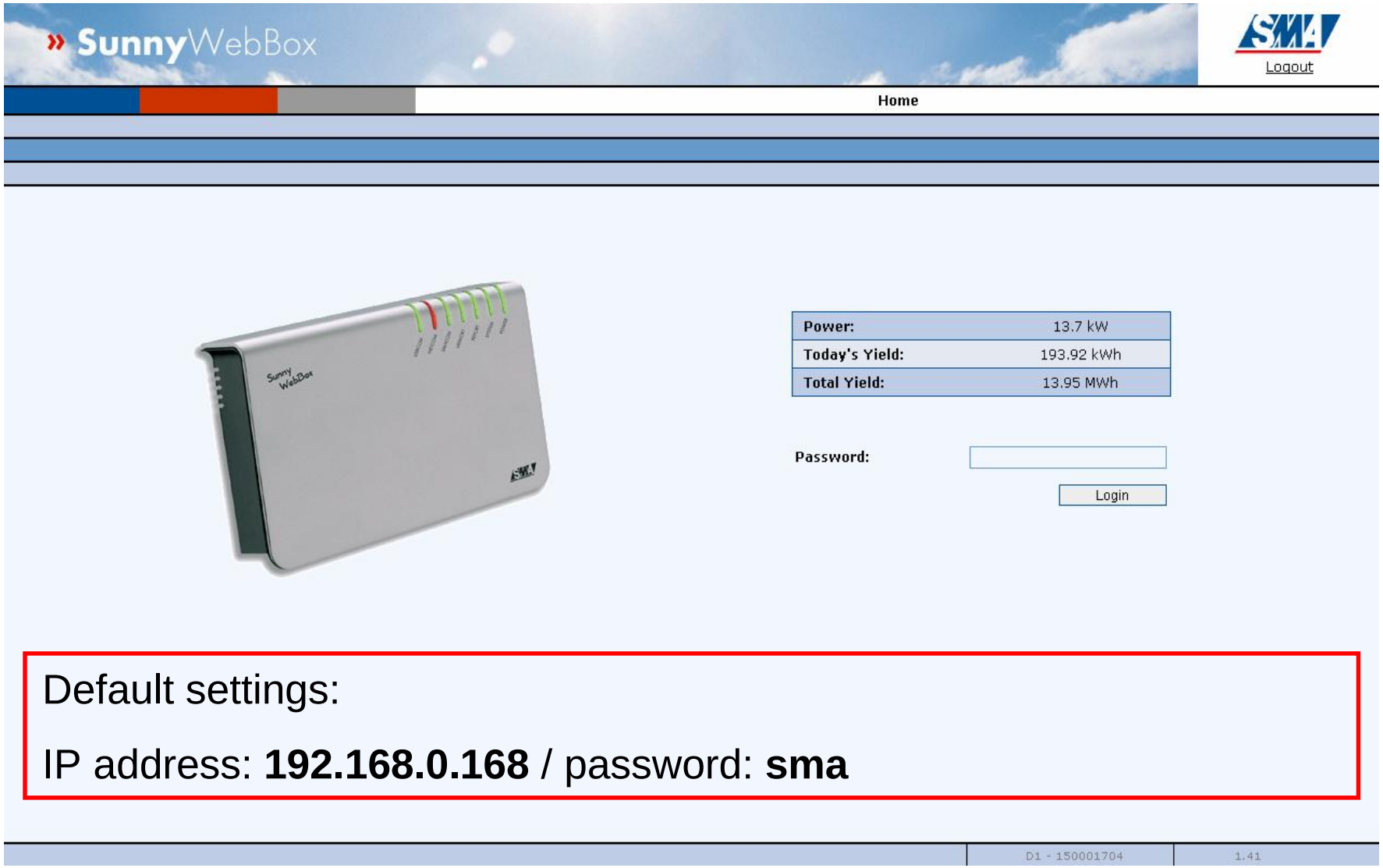
192. 168. 0. 168

We have to set the Computer IP address within the same Network address range.

And Within the same computer address range.

192. 168. 0. 100

Initial Start-up



Default settings:

IP address: **192.168.0.168** / password: **sma**

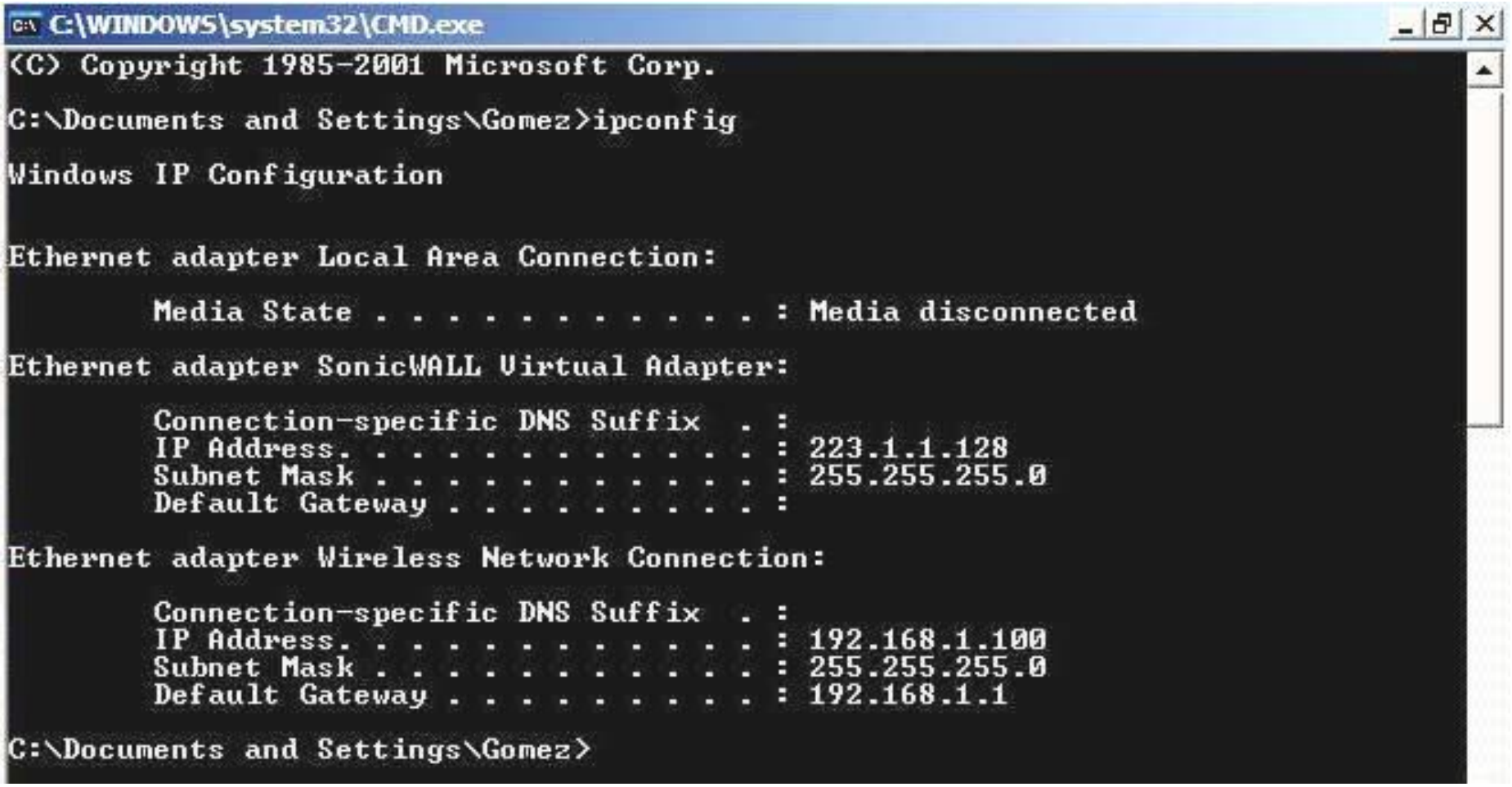
- After we have communication between the computer and the Web Box we can set the Web Box IP address so it is compatible with the Local Area Network.

Coffe Break

Setting the IP address of the computer

- At a computer currently on the network do the following:
- Start-Run-CMD-ipconfig /all
- Record the current IP address of the computer
- Record the Default Gateway Address
- Record the DNS Server Address

IP Config

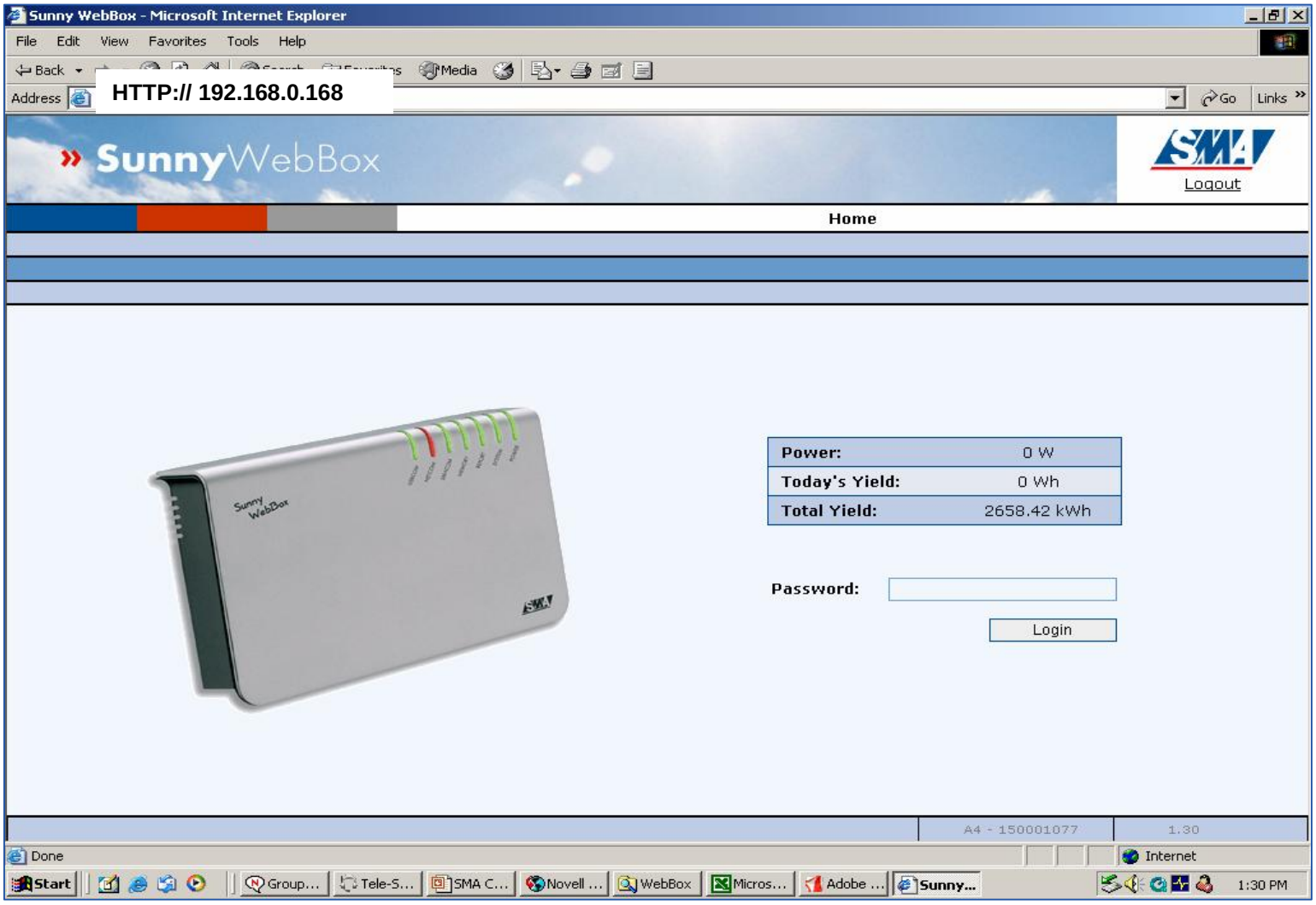

C:\WINDOWS\system32\CMD.exe
(C) Copyright 1985-2001 Microsoft Corp.
C:\Documents and Settings\Gomez>ipconfig
Windows IP Configuration
Ethernet adapter Local Area Connection:
Media State . . . . . : Media disconnected
Ethernet adapter SonicWALL Virtual Adapter:
Connection-specific DNS Suffix . :
IP Address. . . . . : 223.1.1.128
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . :
Ethernet adapter Wireless Network Connection:
Connection-specific DNS Suffix . :
IP Address. . . . . : 192.168.1.100
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.1.1
C:\Documents and Settings\Gomez>

Sunny WebBox Installation

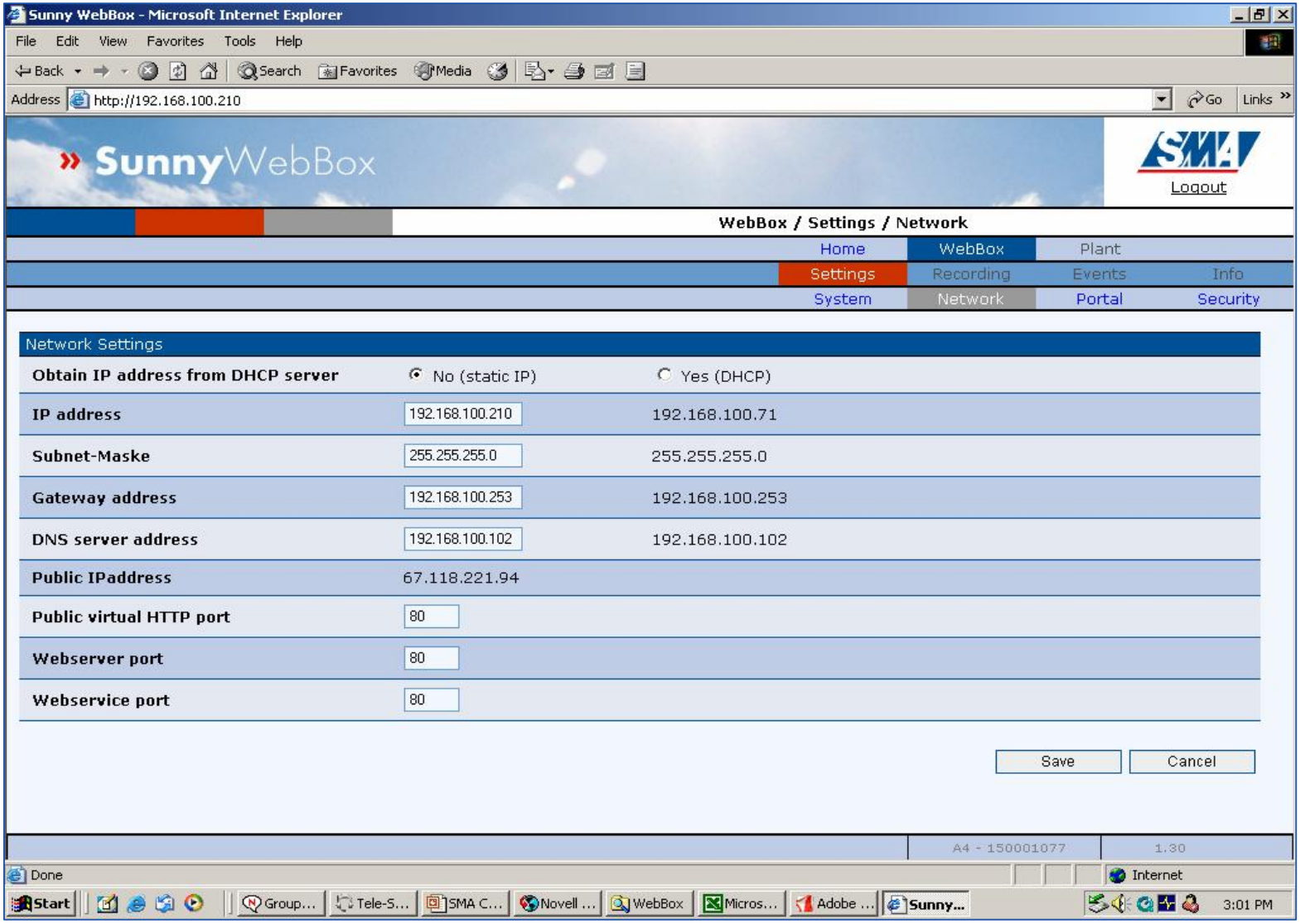
- The default address of the WebBox is 192.168.0.168

- Your computer must be in the 192.168.0.xxx address range :
- Go to Start-Settings-Network and Dial up connections
- Click on Local Area Connection icon
- Select properties then in properties window select TCI/IP
- Select “Use following address:”
- Input 192.168.0.100 then say ok and exit all settings windows

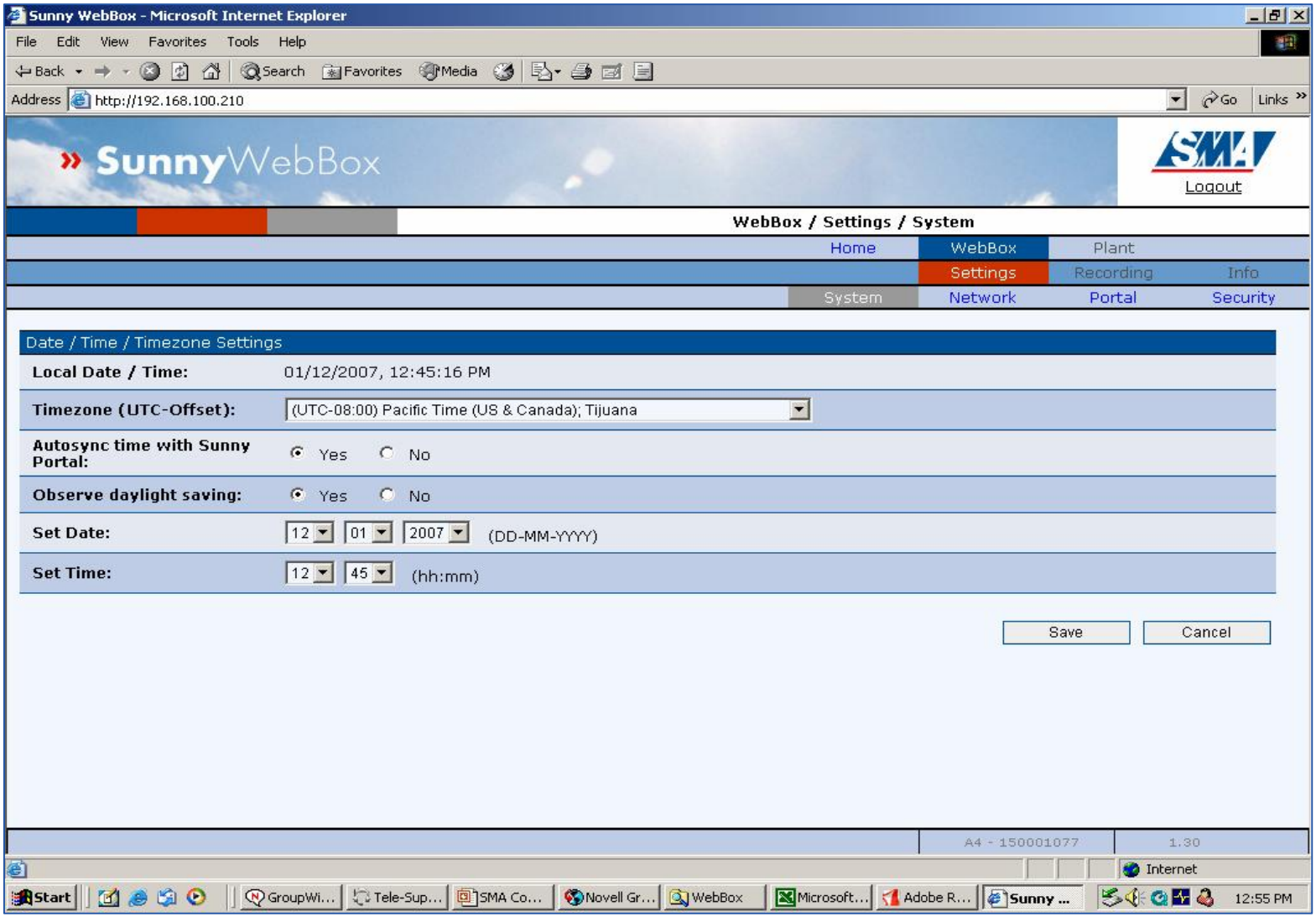
Type HTTP:// 192.168.0.168 in your web browser



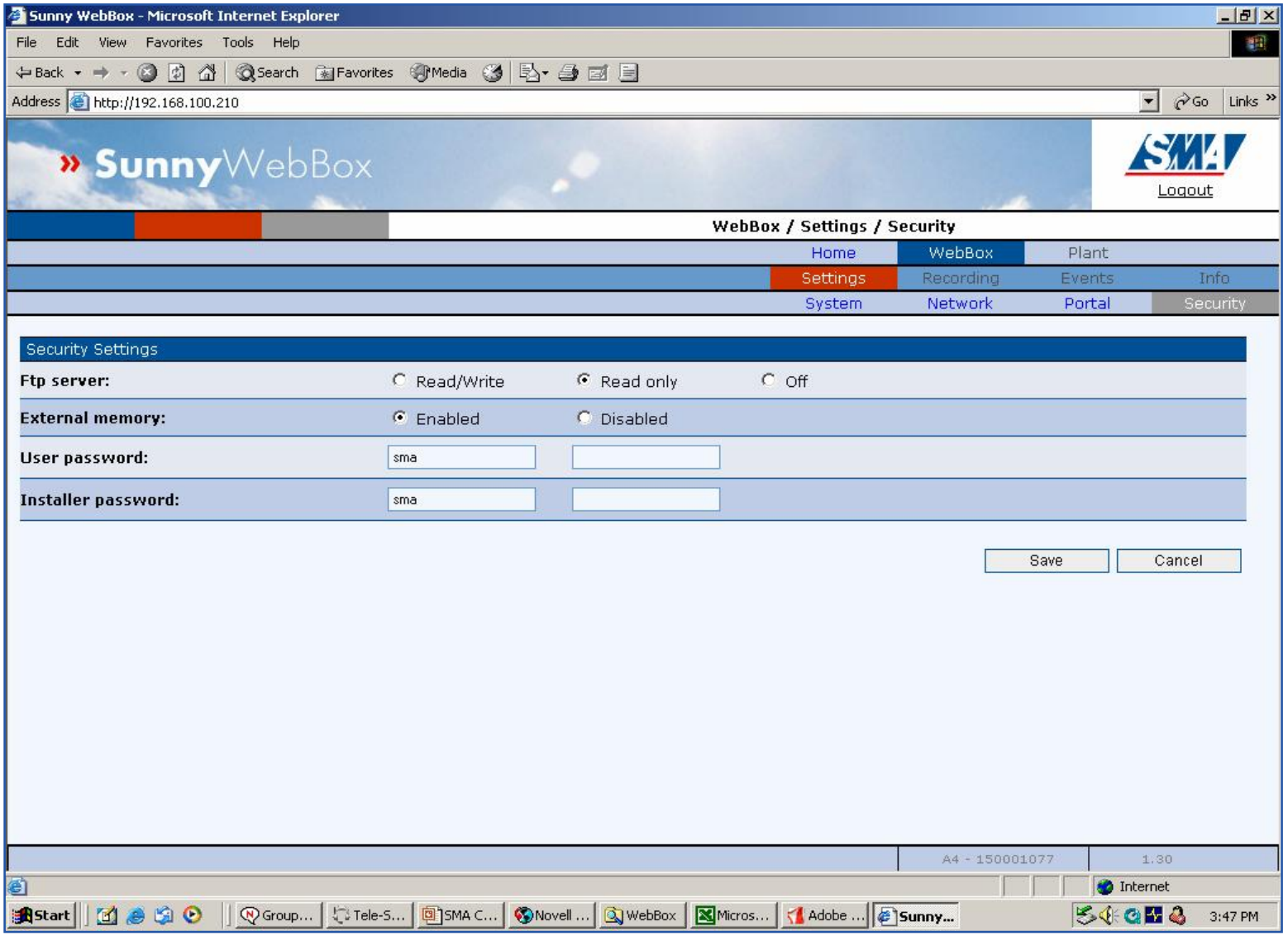
The Network Screen



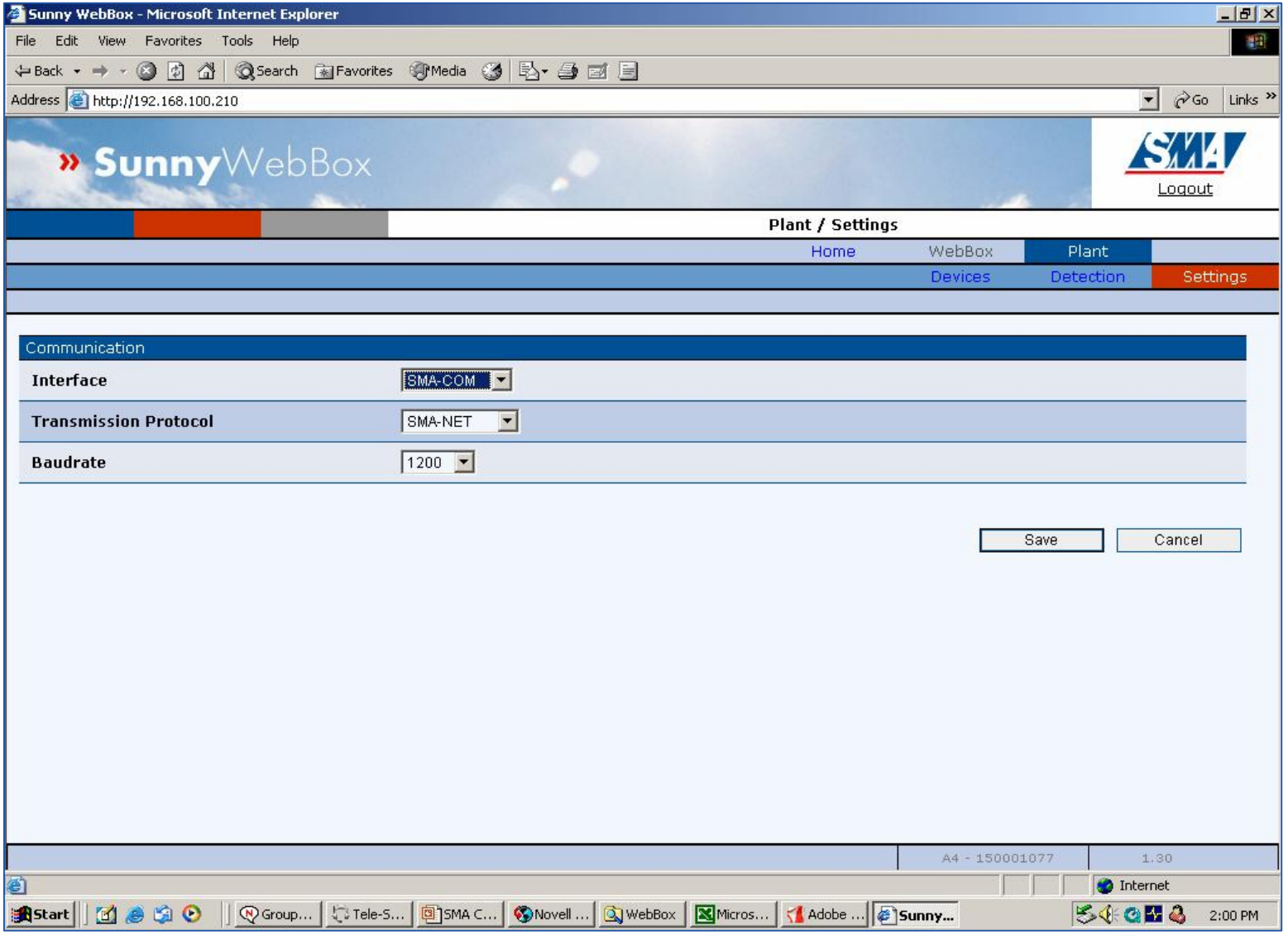
The WebBox Settings Screen


Sunny WebBox - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://192.168.100.210
Go Links
SunnyWebBox
Logout
WebBox / Settings / System
Home WebBox Plant
Settings Recording Info
System Network Portal Security
Date / Time / Timezone Settings
Local Date / Time: 01/12/2007, 12:45:16 PM
Timezone (UTC-Offset): (UTC-08:00) Pacific Time (US & Canada); Tijuana
Autosync time with Sunny Portal: Yes No
Observe daylight saving: Yes No
Set Date: 12 01 2007 (DD-MM-YYYY)
Set Time: 12 45 (hh:mm)
Save Cancel
A4 - 150001077 1.30
Internet
Start GroupWi... Tele-Sup... SMA Co... Novell Gr... WebBox Microsoft... Adobe R... Sunny ... 12:55 PM

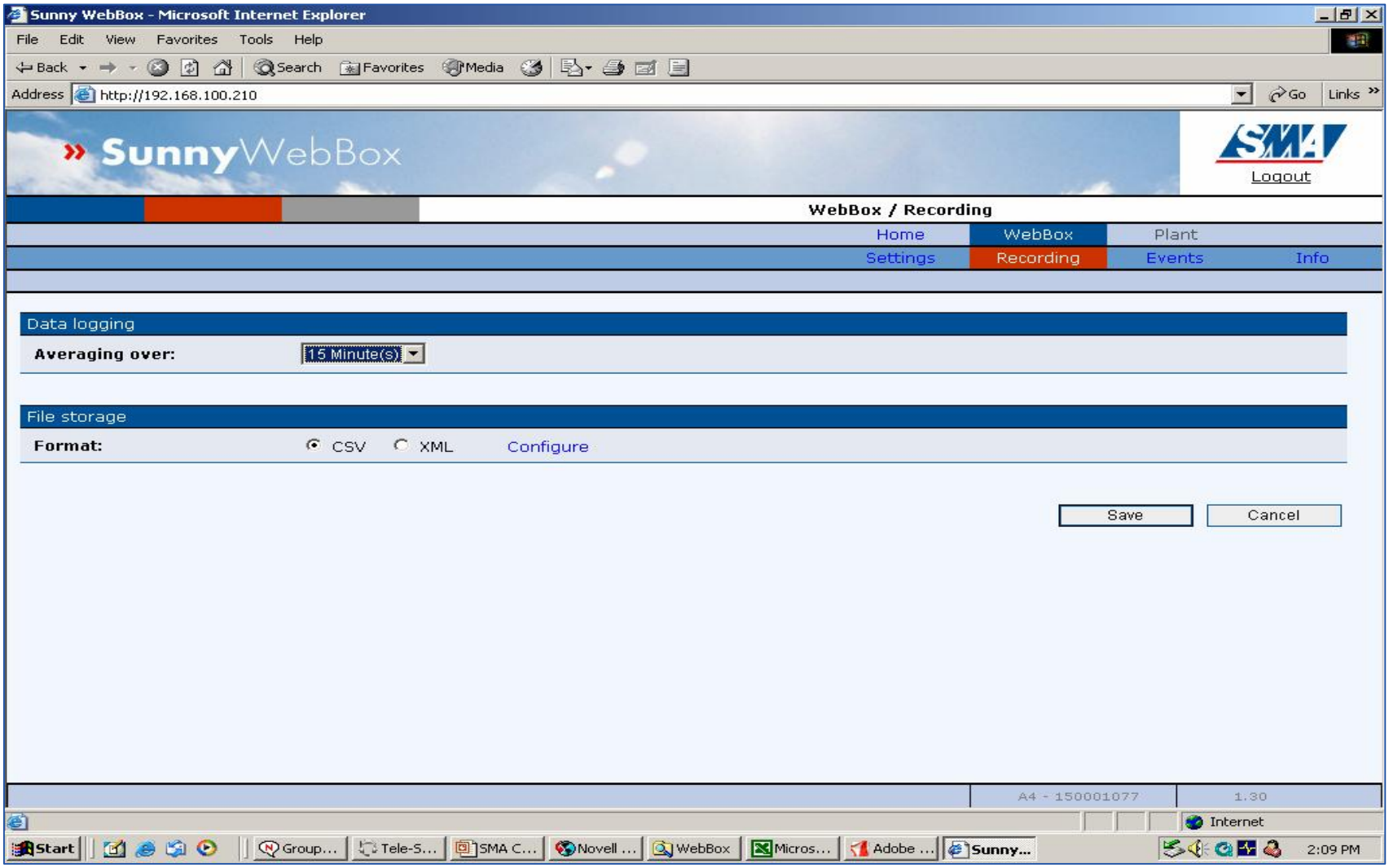
Security Screen



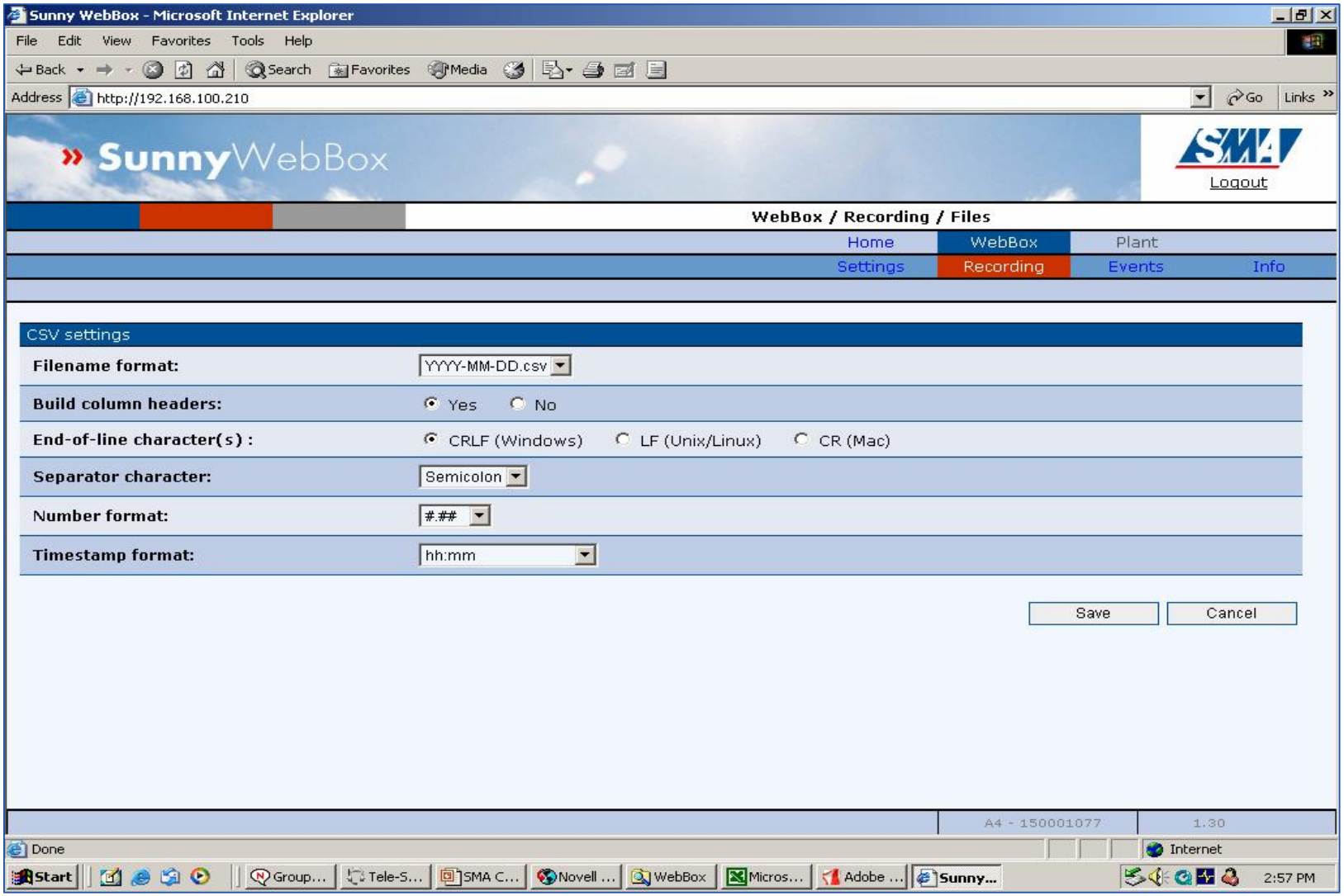
The Plant Settings Screen



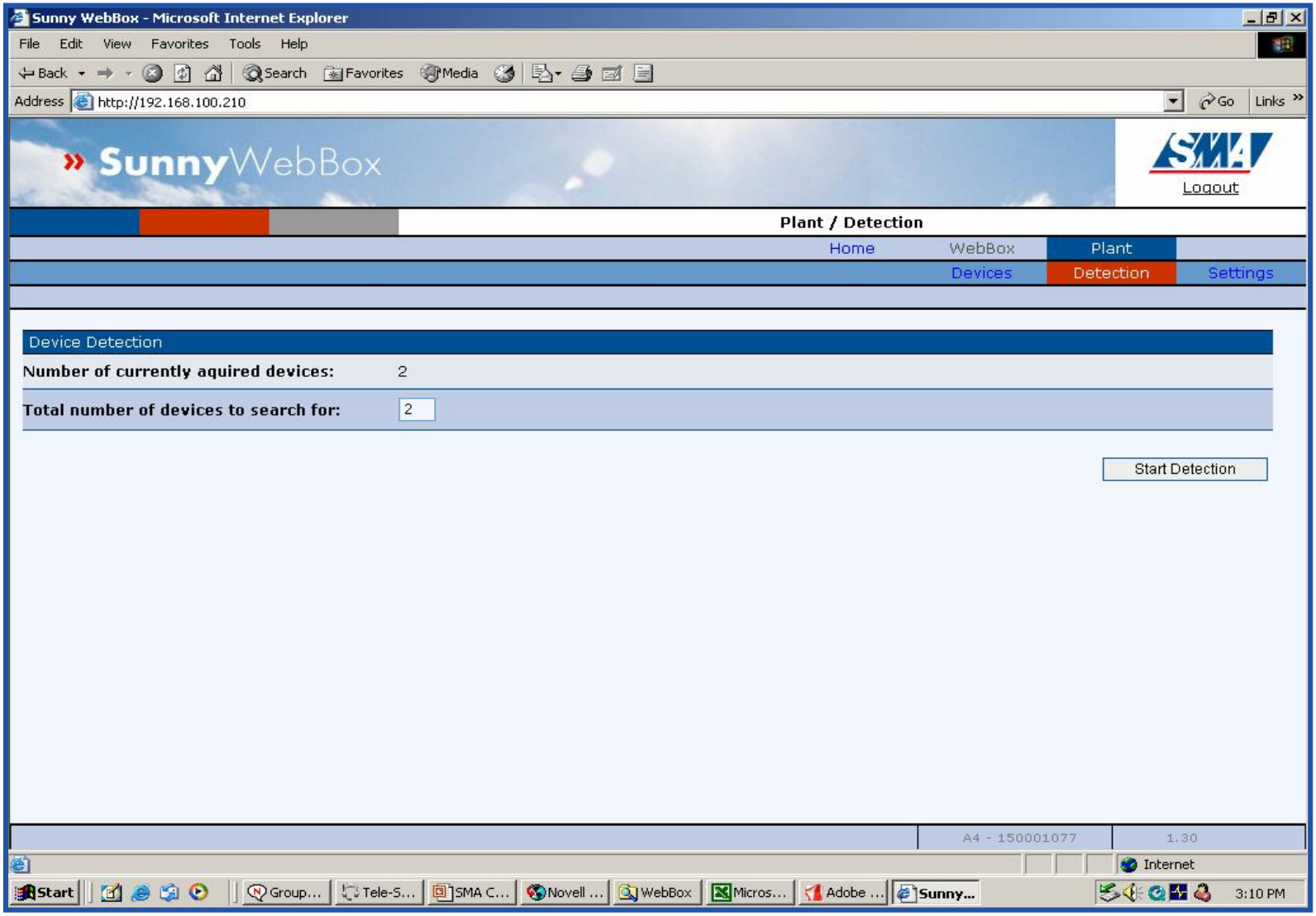
The Recording Screen



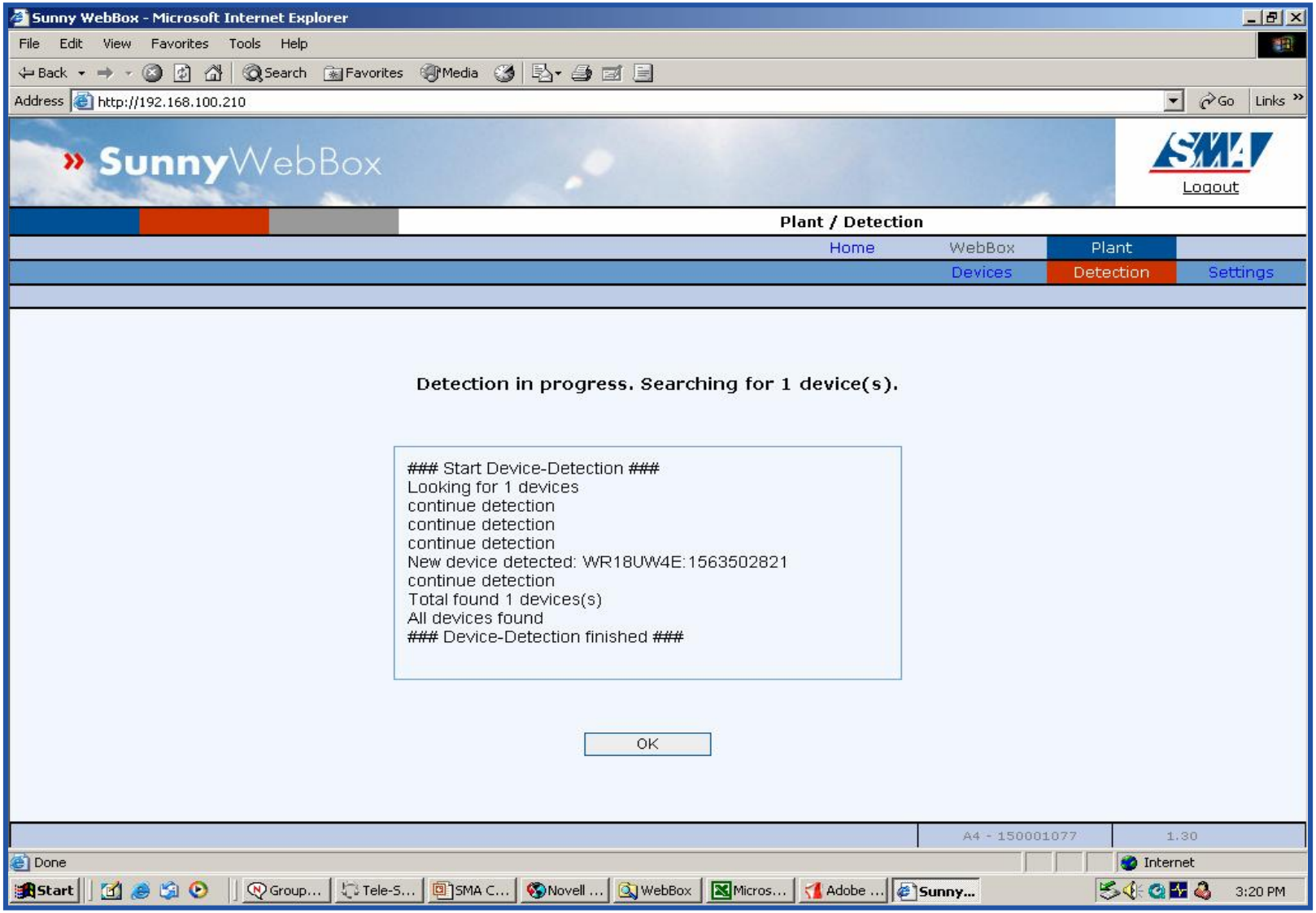
The Formatting Screen



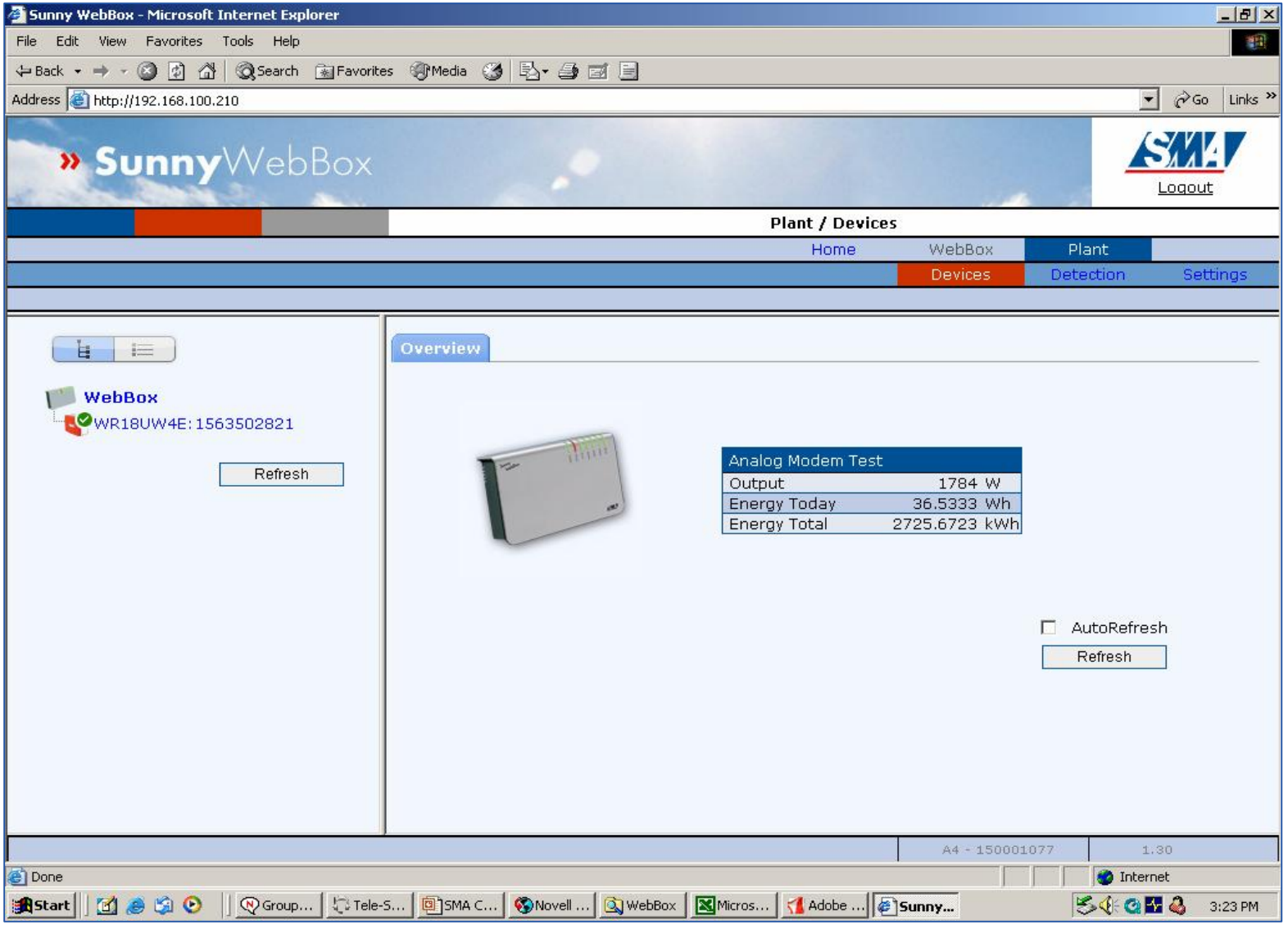
Plant Detection Screen


Sunny WebBox - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://192.168.100.210
Go Links
SunnyWebBox
Logout
Plant / Detection
Home WebBox Plant
Devices Detection Settings
Device Detection
Number of currently aquired devices: 2
Total number of devices to search for: 2
Start Detection
A4 - 150001077 1.30
Internet
Start Group... Tele-S... SMA C... Novell ... WebBox Micros... Adobe ... Sunny... 3:10 PM

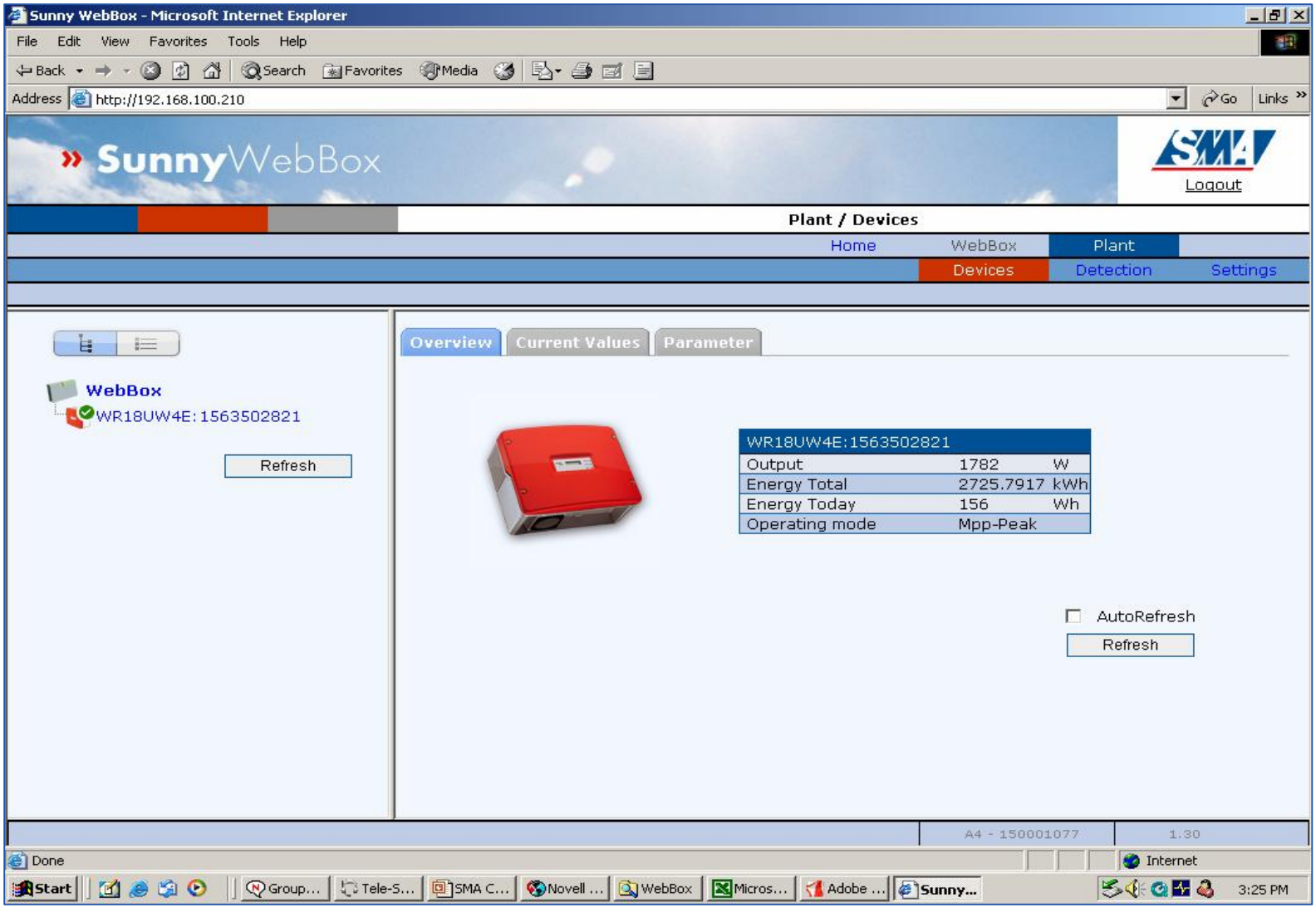
Plant Detection Screen



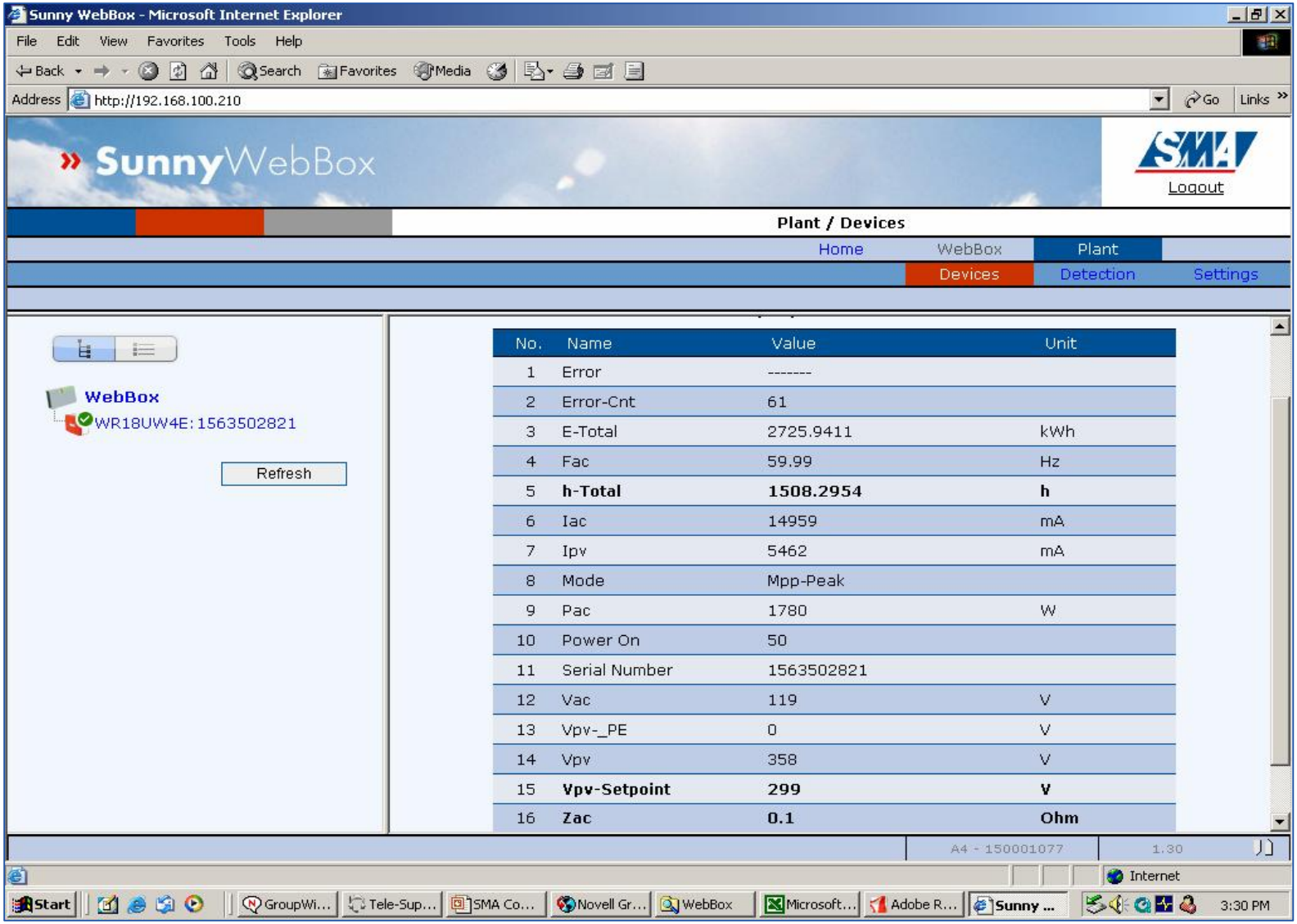
Plant Devices Screen



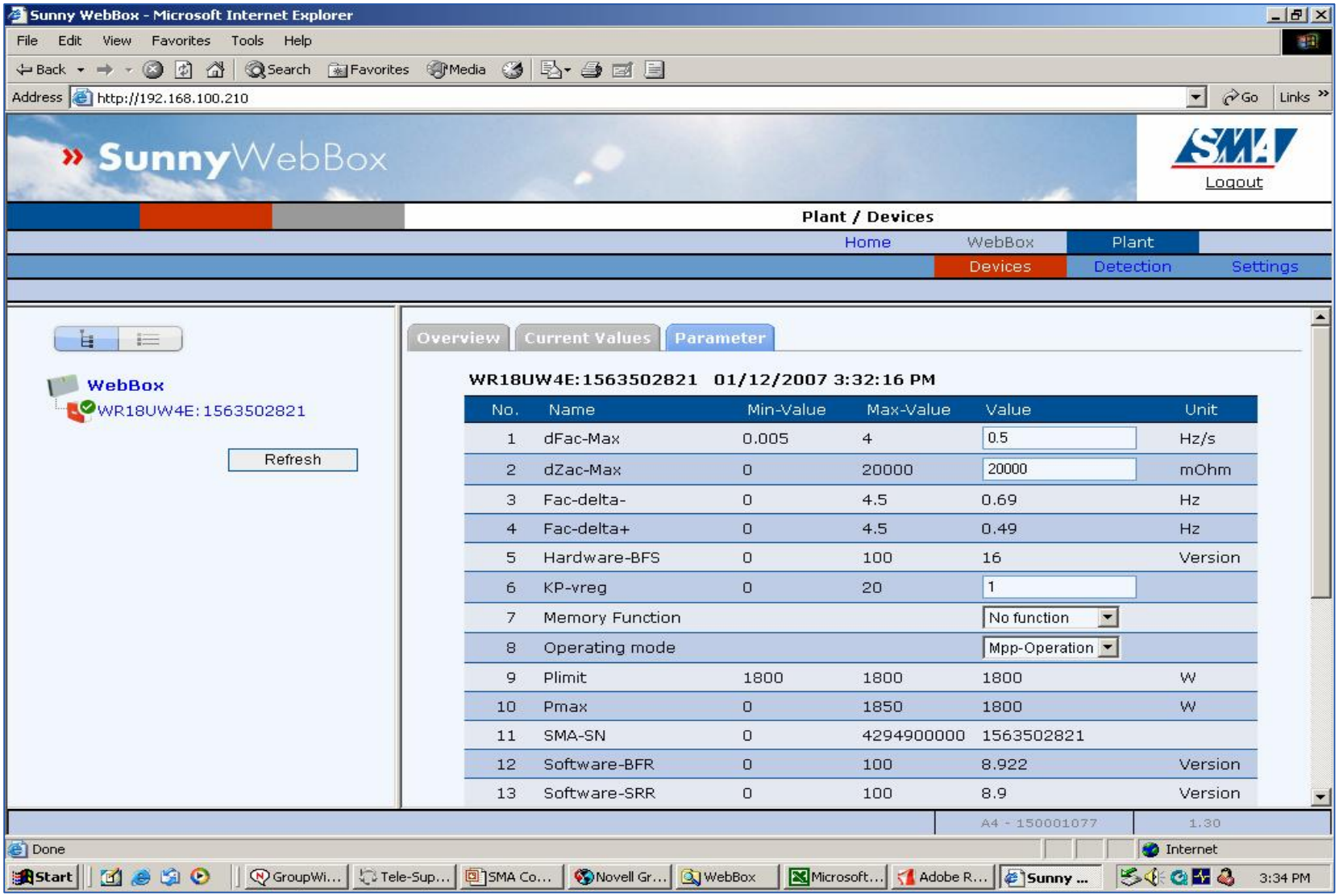
Plant Devices Overview Screen



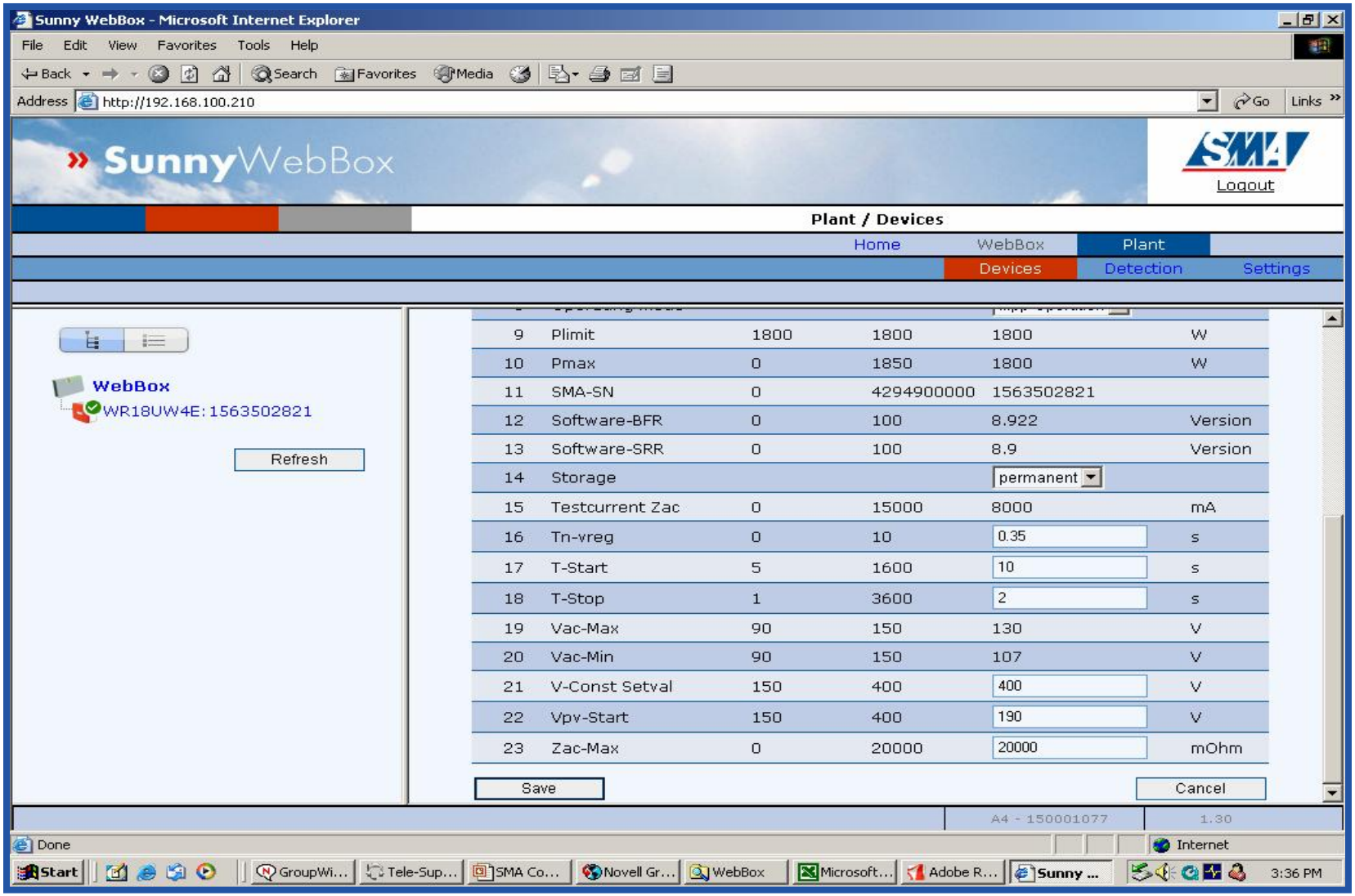
Plant Devices Current Values Screen



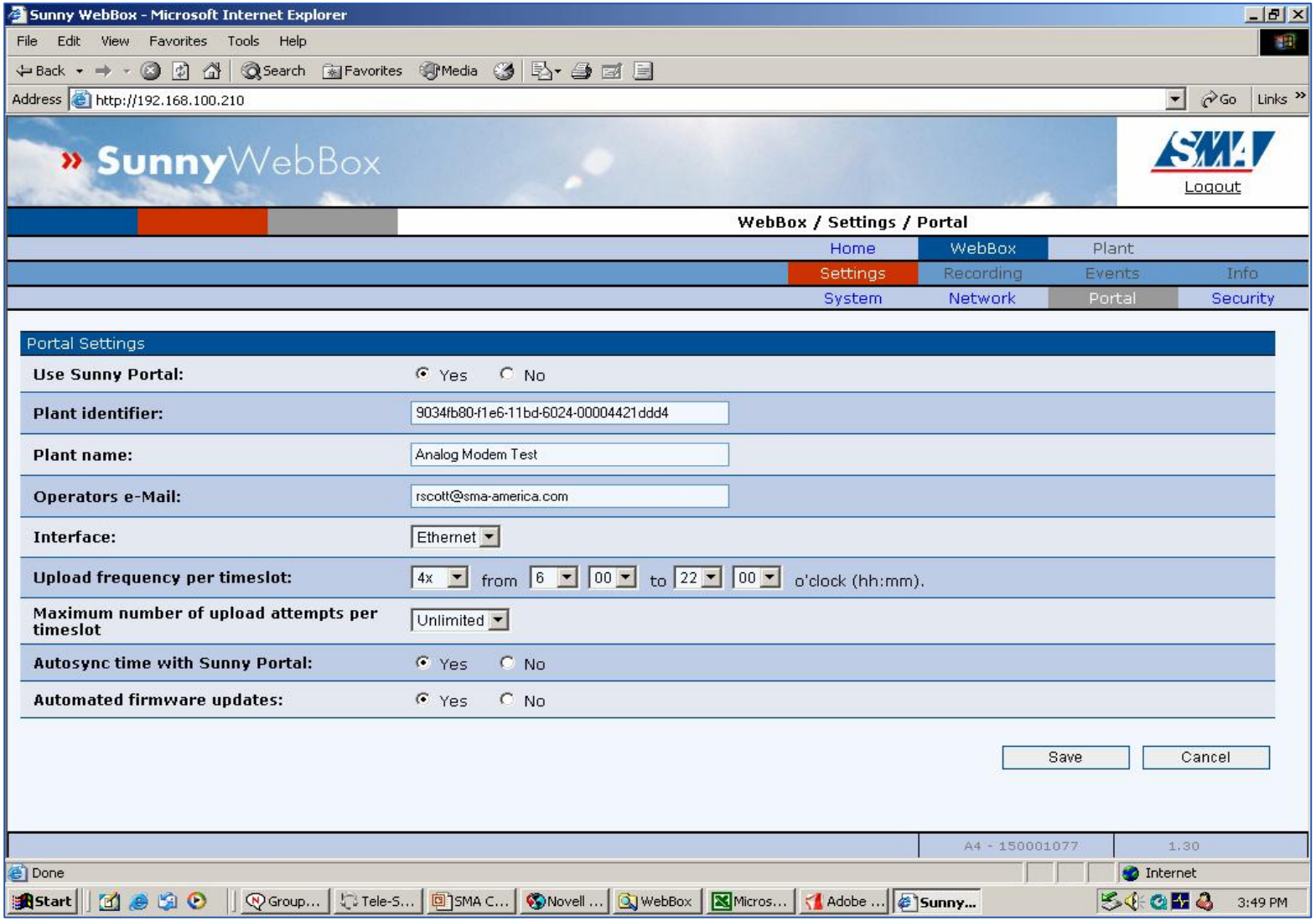
Plant Devices Parameters Screen (1)



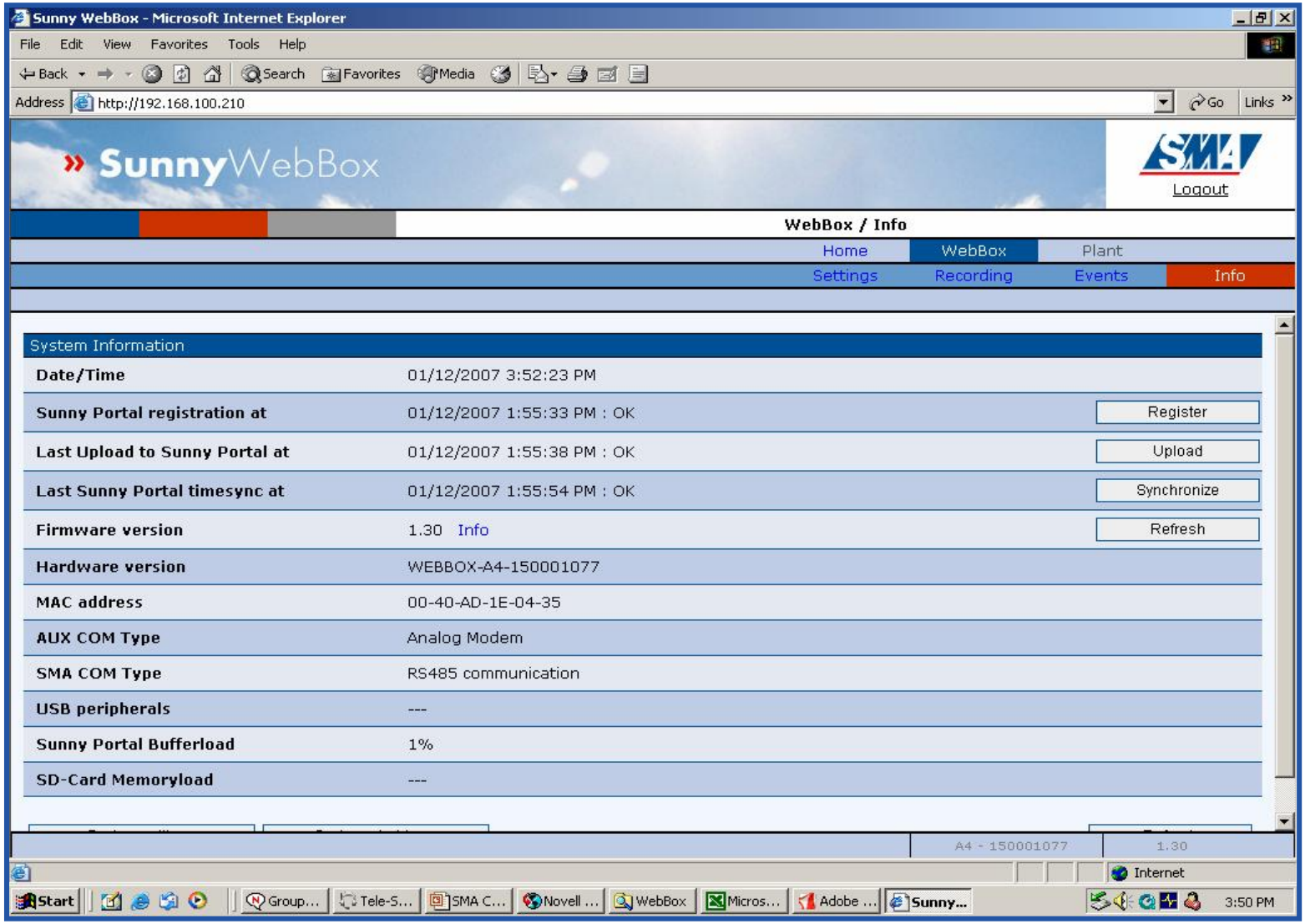
The Plant Devices Parameters Screen (2)



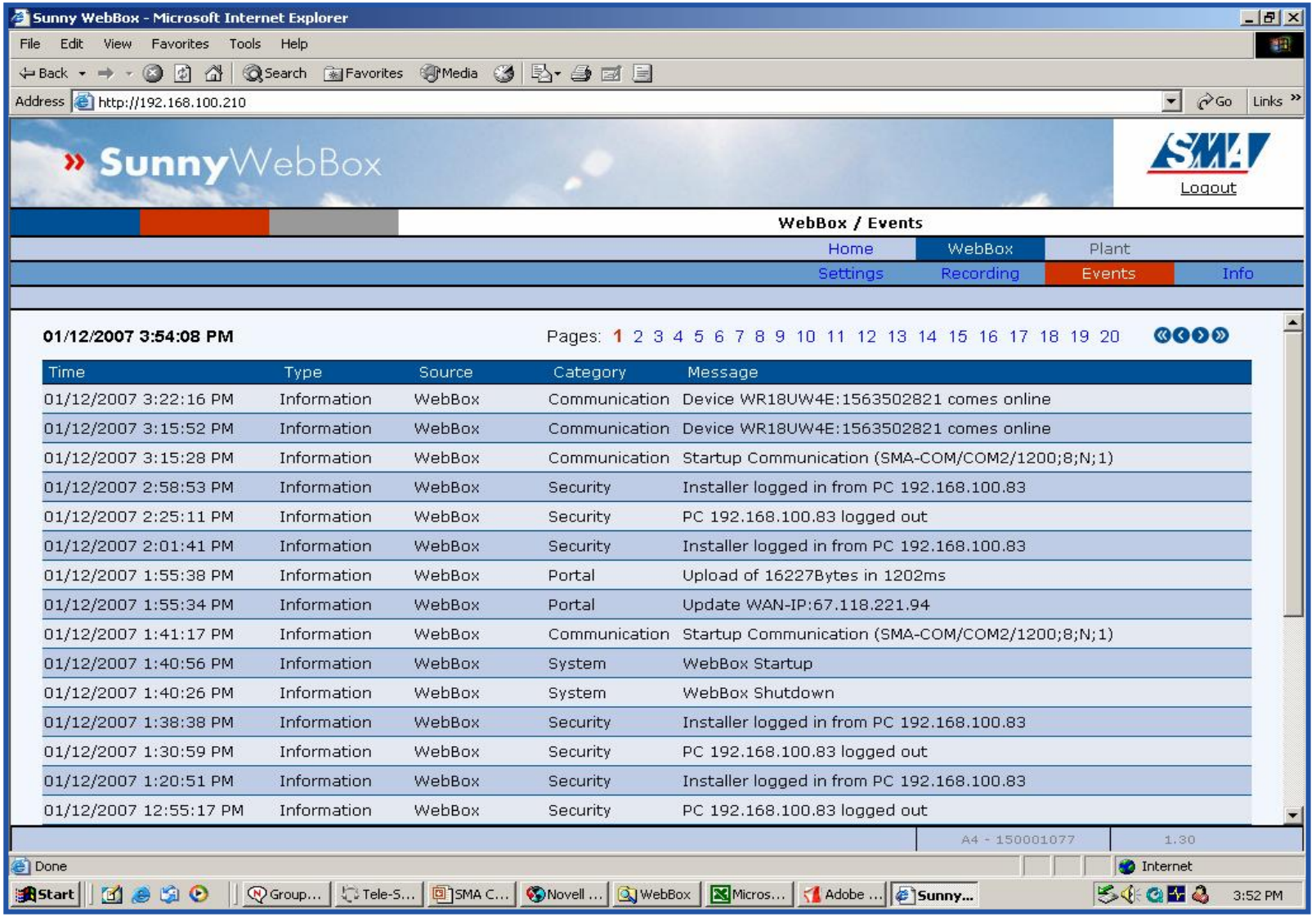
Portal Screen


Sunny WebBox - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://192.168.100.210
Go Links
SunnyWebBox
Logout
WebBox / Settings / Portal
Home WebBox Plant
Settings Recording Events Info
System Network Portal Security
Portal Settings
Use Sunny Portal: Yes No
Plant identifier: 9034fb80-f1e6-11bd-6024-00004421ddd4
Plant name: Analog Modem Test
Operators e-Mail: rscott@sma-america.com
Interface: Ethernet
Upload frequency per timeslot: 4x from 6 00 to 22 00 o'clock (hh:mm).
Maximum number of upload attempts per timeslot: Unlimited
Autosync time with Sunny Portal: Yes No
Automated firmware updates: Yes No
Save Cancel
A4 - 150001077 1.30
Done
Internet
Start
Group... Tele-S... SMA C... Novell ... WebBox Micros... Adobe ... Sunny...
3:49 PM

The Info Screen

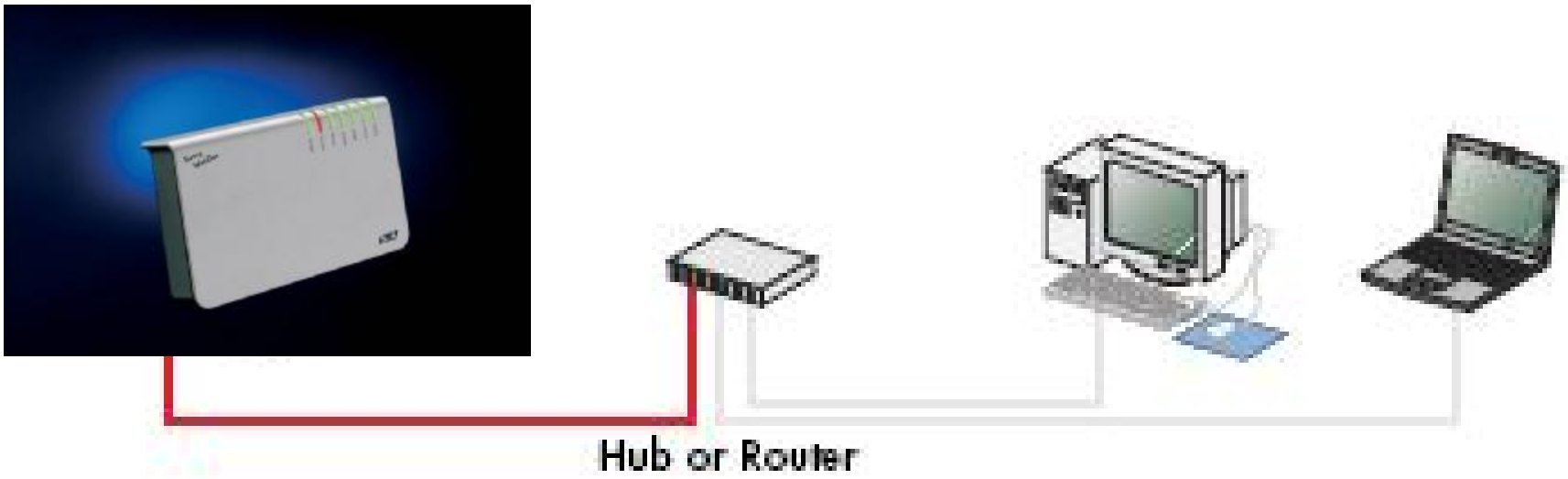


The Events Screen

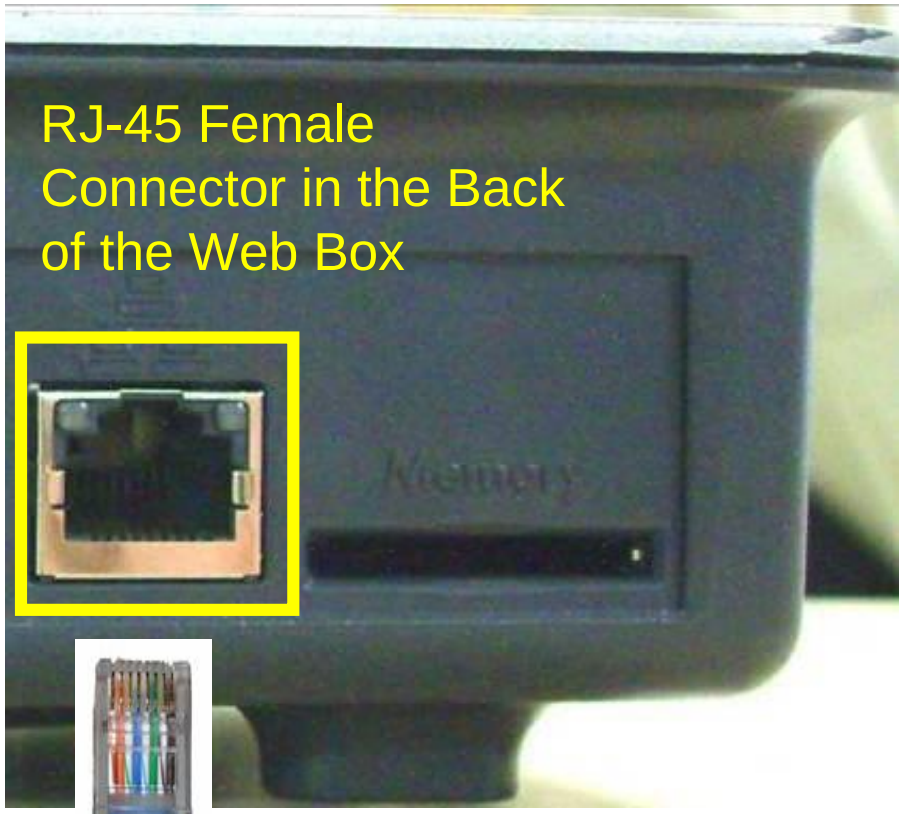

Sunny WebBox - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://192.168.100.210
Go Links
SunnyWebBox
Logout
WebBox / Events
Home WebBox Plant
Settings Recording Events Info
01/12/2007 3:54:08 PM
Pages: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Time Type Source Category Message
01/12/2007 3:22:16 PM Information WebBox Communication Device WR18UW4E:1563502821 comes online
01/12/2007 3:15:52 PM Information WebBox Communication Device WR18UW4E:1563502821 comes online
01/12/2007 3:15:28 PM Information WebBox Communication Startup Communication (SMA-COM/COM2/1200;8;N;1)
01/12/2007 2:58:53 PM Information WebBox Security Installer logged in from PC 192.168.100.83
01/12/2007 2:25:11 PM Information WebBox Security PC 192.168.100.83 logged out
01/12/2007 2:01:41 PM Information WebBox Security Installer logged in from PC 192.168.100.83
01/12/2007 1:55:38 PM Information WebBox Portal Upload of 16227Bytes in 1202ms
01/12/2007 1:55:34 PM Information WebBox Portal Update WAN-IP:67.118.221.94
01/12/2007 1:41:17 PM Information WebBox Communication Startup Communication (SMA-COM/COM2/1200;8;N;1)
01/12/2007 1:40:56 PM Information WebBox System WebBox Startup
01/12/2007 1:40:26 PM Information WebBox System WebBox Shutdown
01/12/2007 1:38:38 PM Information WebBox Security Installer logged in from PC 192.168.100.83
01/12/2007 1:30:59 PM Information WebBox Security PC 192.168.100.83 logged out
01/12/2007 1:20:51 PM Information WebBox Security Installer logged in from PC 192.168.100.83
01/12/2007 12:55:17 PM Information WebBox Security PC 192.168.100.83 logged out
A4 - 150001077
1.30
Done
Internet
Start
Group...
Tele-S...
SMA C...
Novell ...
WebBox
Micros...
Adobe ...
Sunny...
3:52 PM

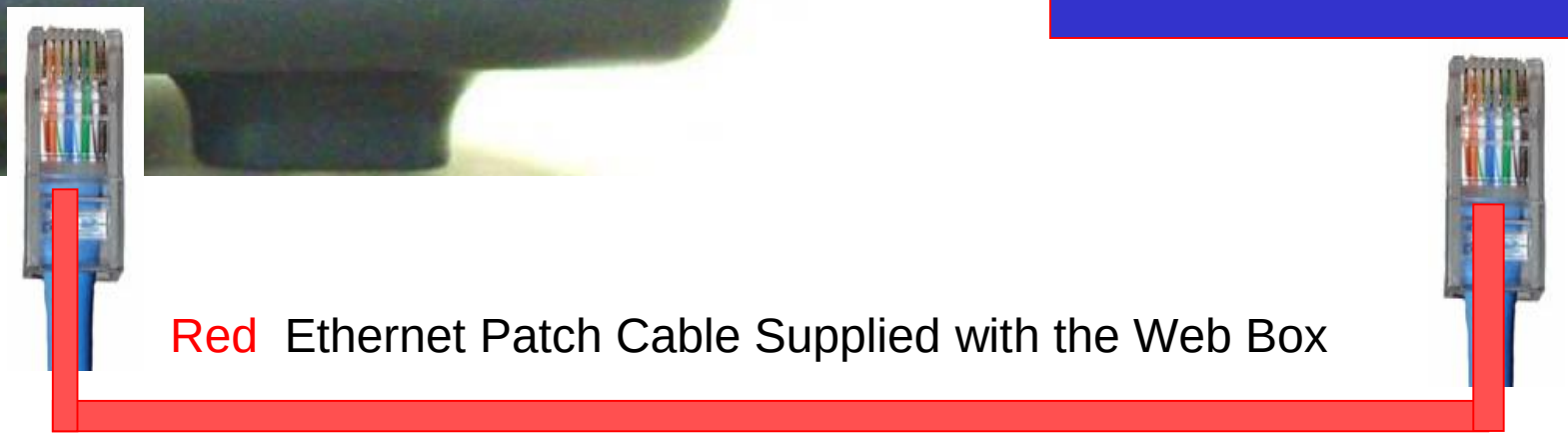
Sunny WebBox

- Connecting to a PC via a Local Area Network



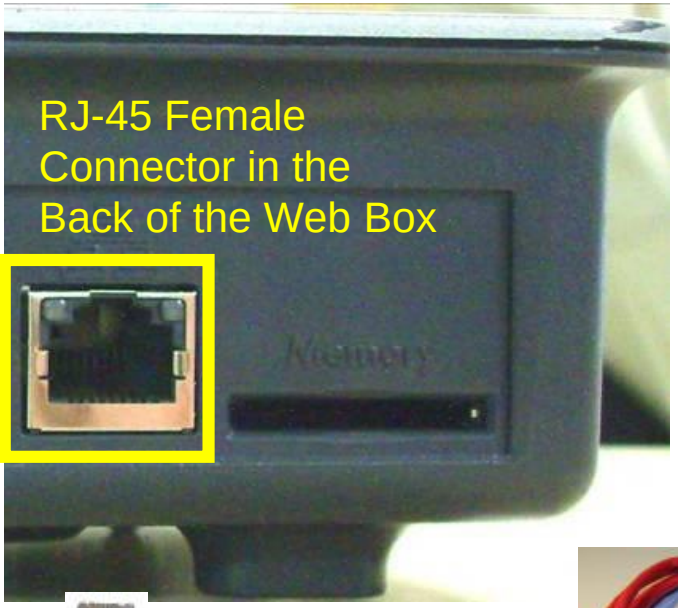
Connecting the Red Ethernet Patch Cable between the Web Box and the Router



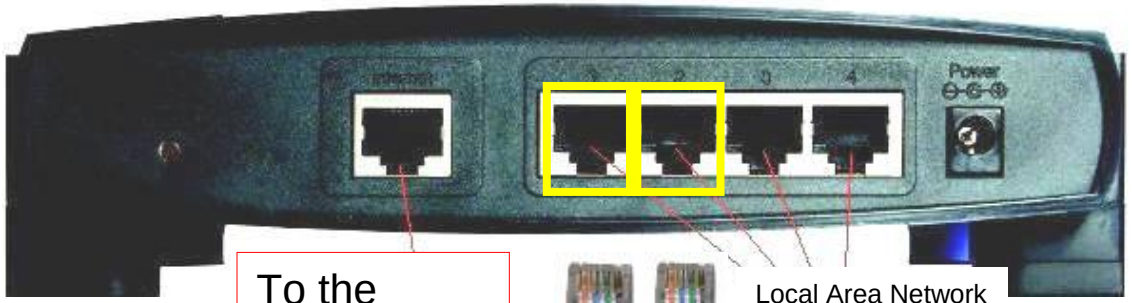


Web Box and Computer connected to the Router

Web Box



Router

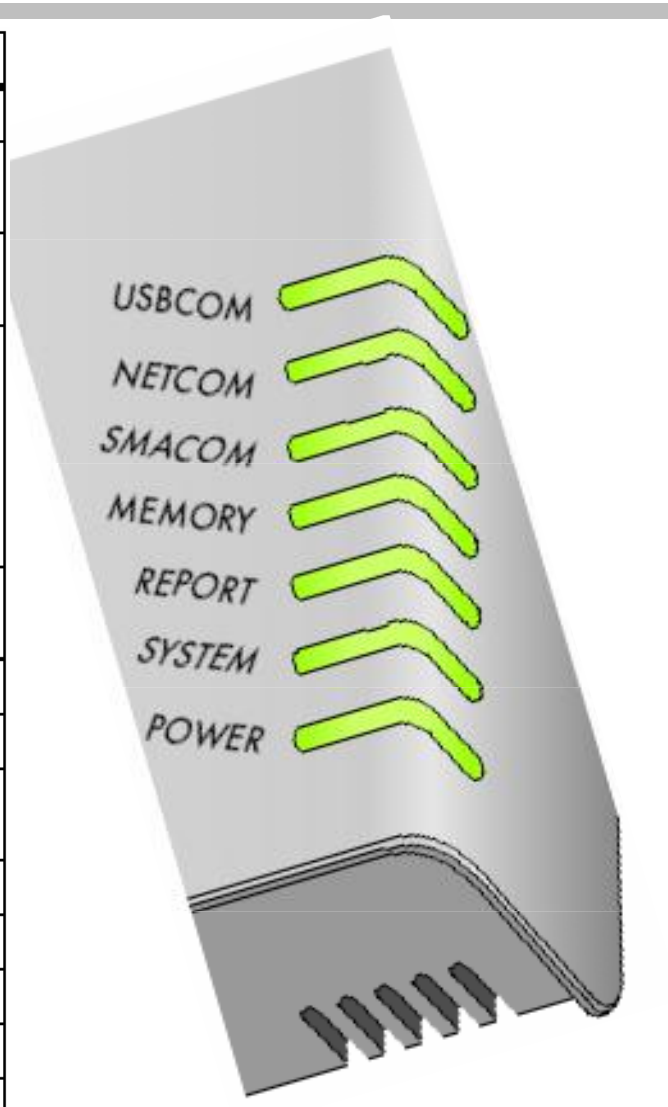


RJ-45 Female
Ethernet Connector
in the Back of the
PC or Laptop

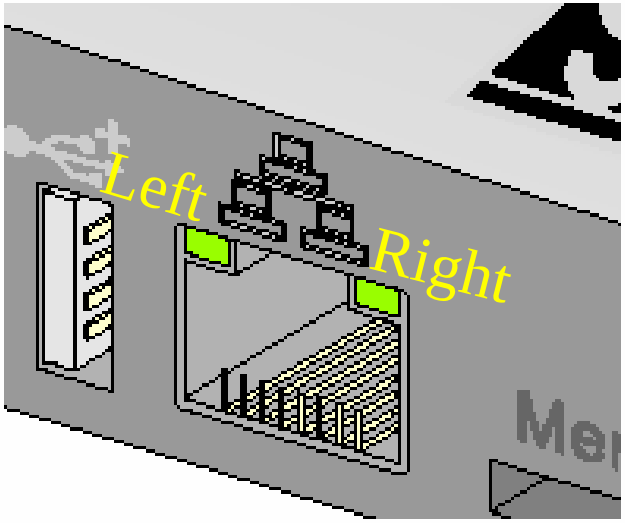
Red Ethernet Patch Cable Supplied with the Web Box

Sunny WebBox Status Display

LED	Status	Functioning
USBCOM	flashes green	Data are being transferred via the USB port.
NETCOM	flashes green	The Sunny WebBox is currently transmitting data to Sunny Portal.
	glows green	The most recent data transmission to Sunny Portal has been successful.
	red	The most recent data transmission to Sunny Portal has failed. The Sunny WebBox attempts to transmit the data again according to its settings. The Sunny WebBox internal memory can retain the accumulated data for approximately two days.
SMACOM	flashes green	The Sunny WebBox is communicating with an inverter.
MEMORY	glows green	SD card is inserted.
	flashes orange	Data are being written on the SD card.
	glows orange	The free memory space on the SD card has fallen below 10 %.
	glows red	The SD card is full, or write-protected.
REPORT		reserved
SYSTEM	flashes red	The Sunny WebBox is starting.
	glows green	The Sunny WebBox is running.
POWER	glows green	The power supply is ok.

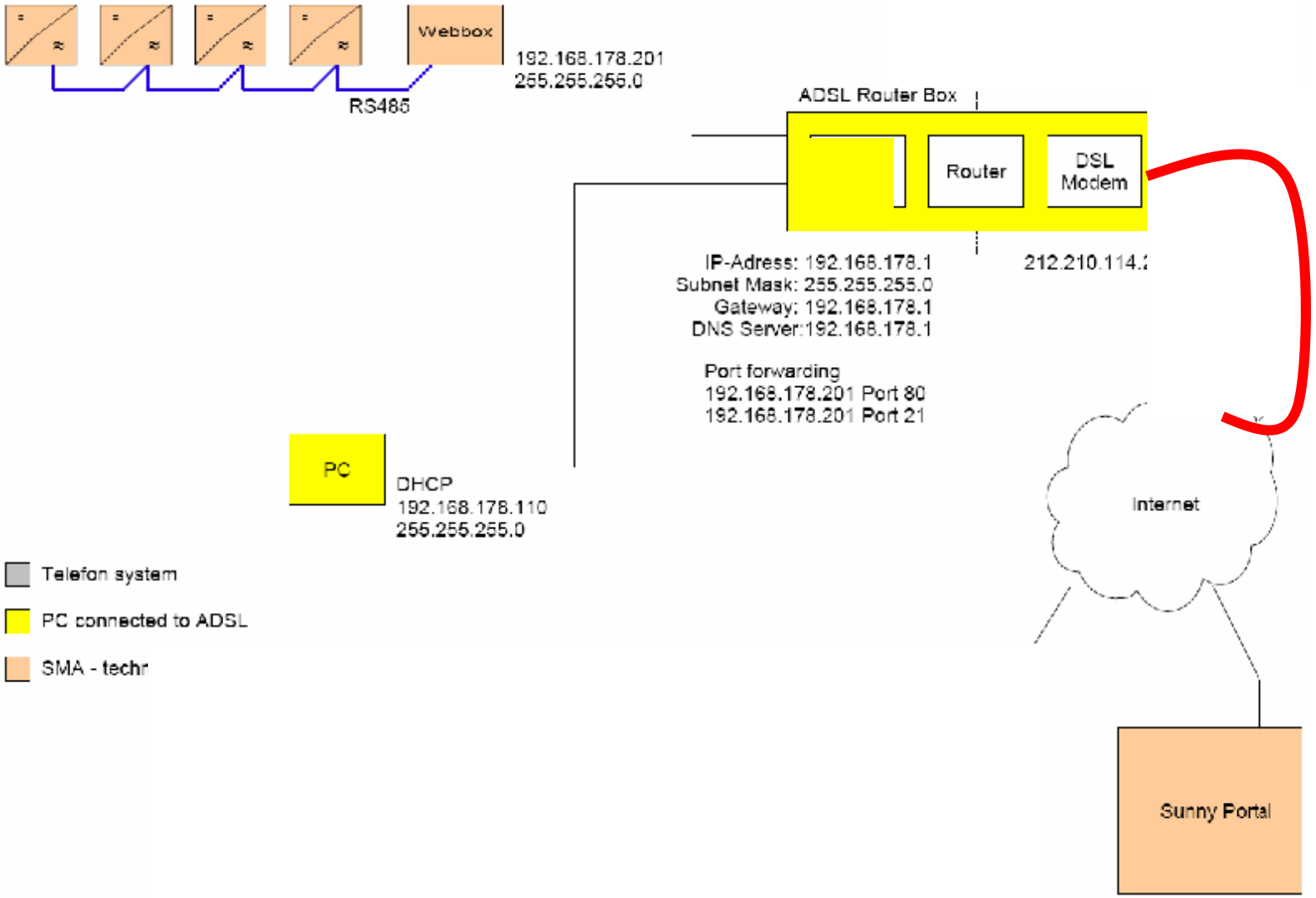


Status Display of the Network Interface



LED	Status	Functioning
Speed (right)	off	10 MBit connection speed
	on	100 MBit connection speed
Link / Activity (left)	off	no connection established
	on	connection (link) established
	flashing	data are being transmitted or received (Activity)

Integration into an ADSL Network

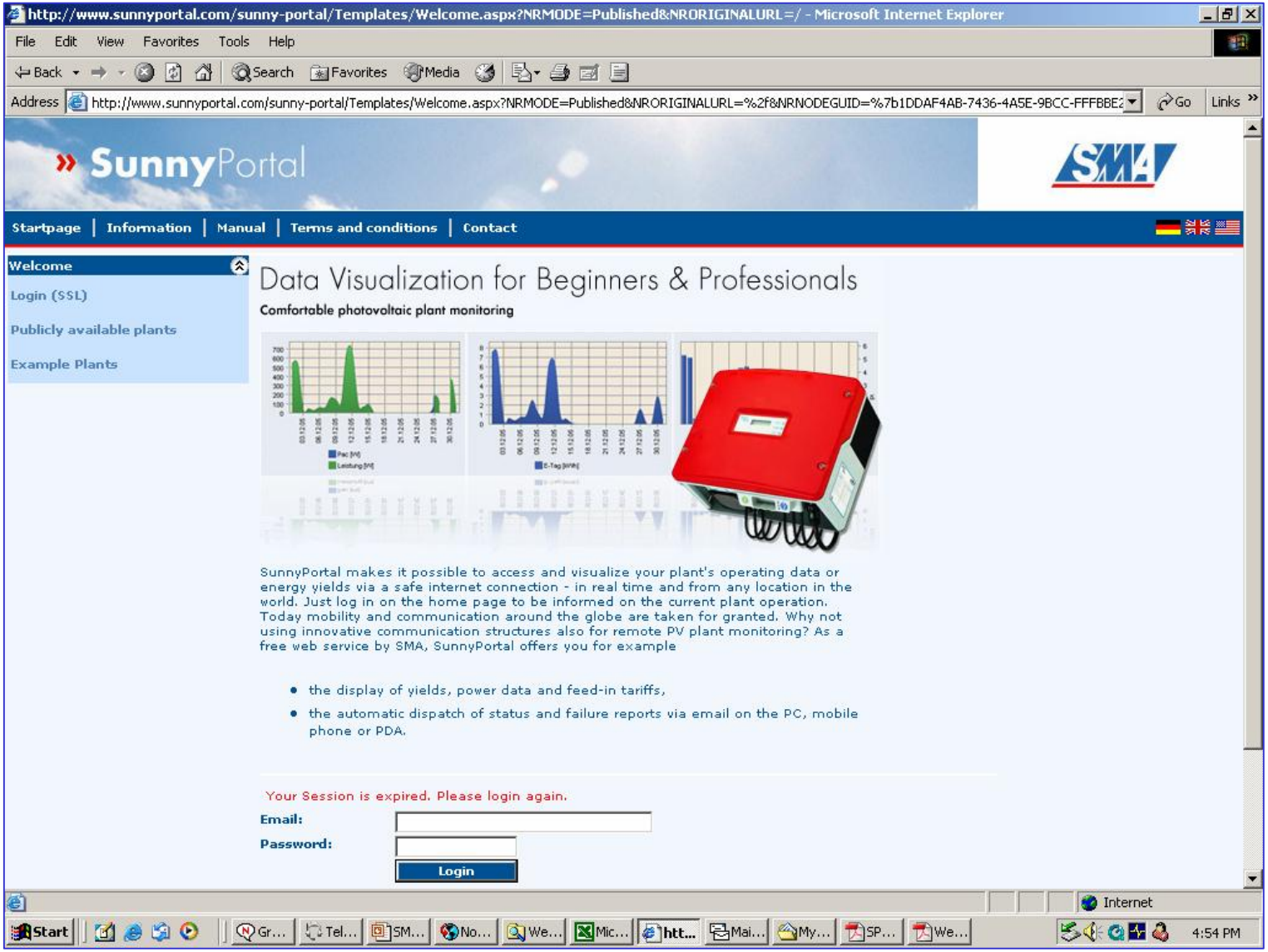


Sunny Portal

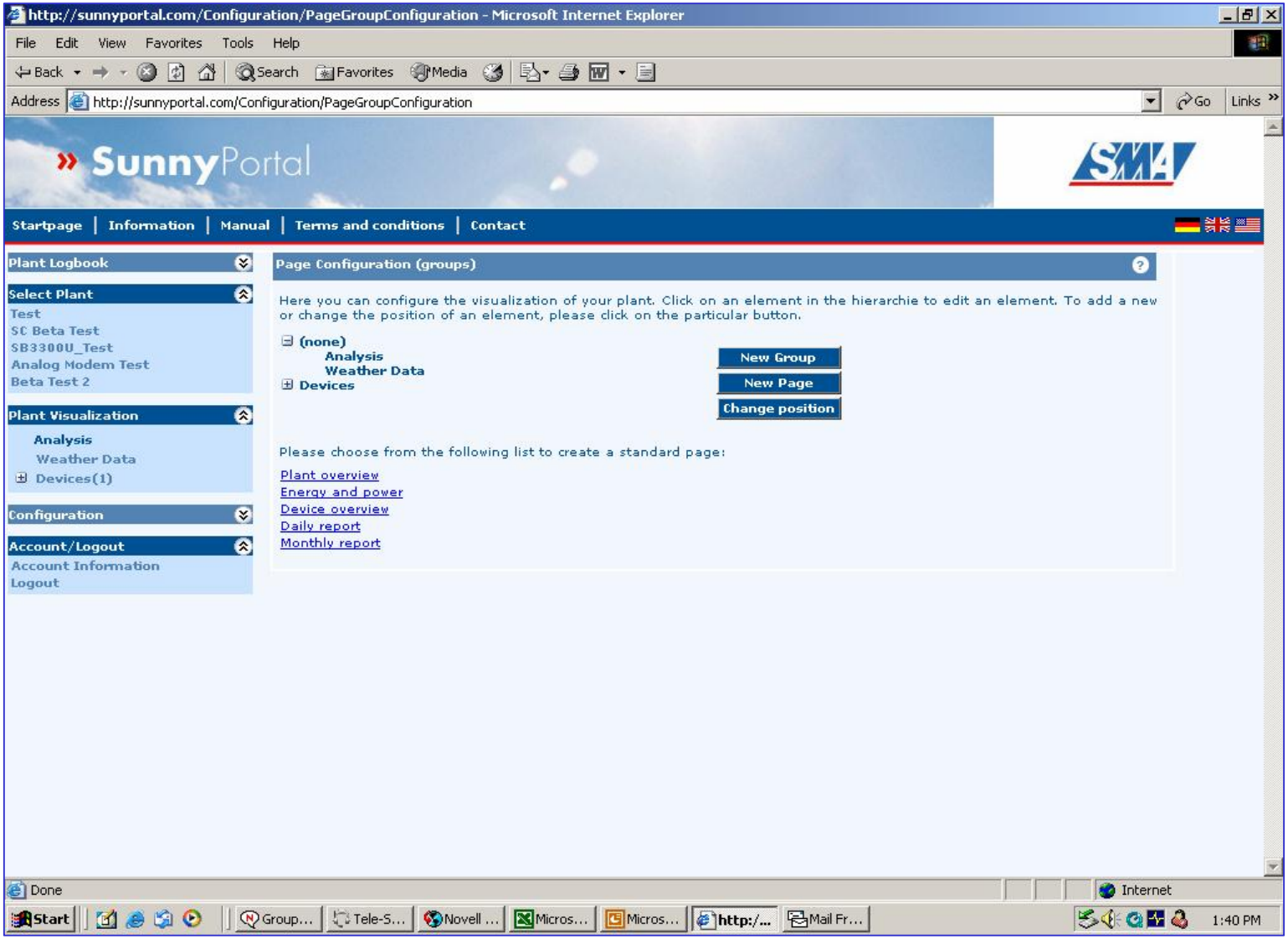
www.sunnyportal.com

Sunny Portal Setup

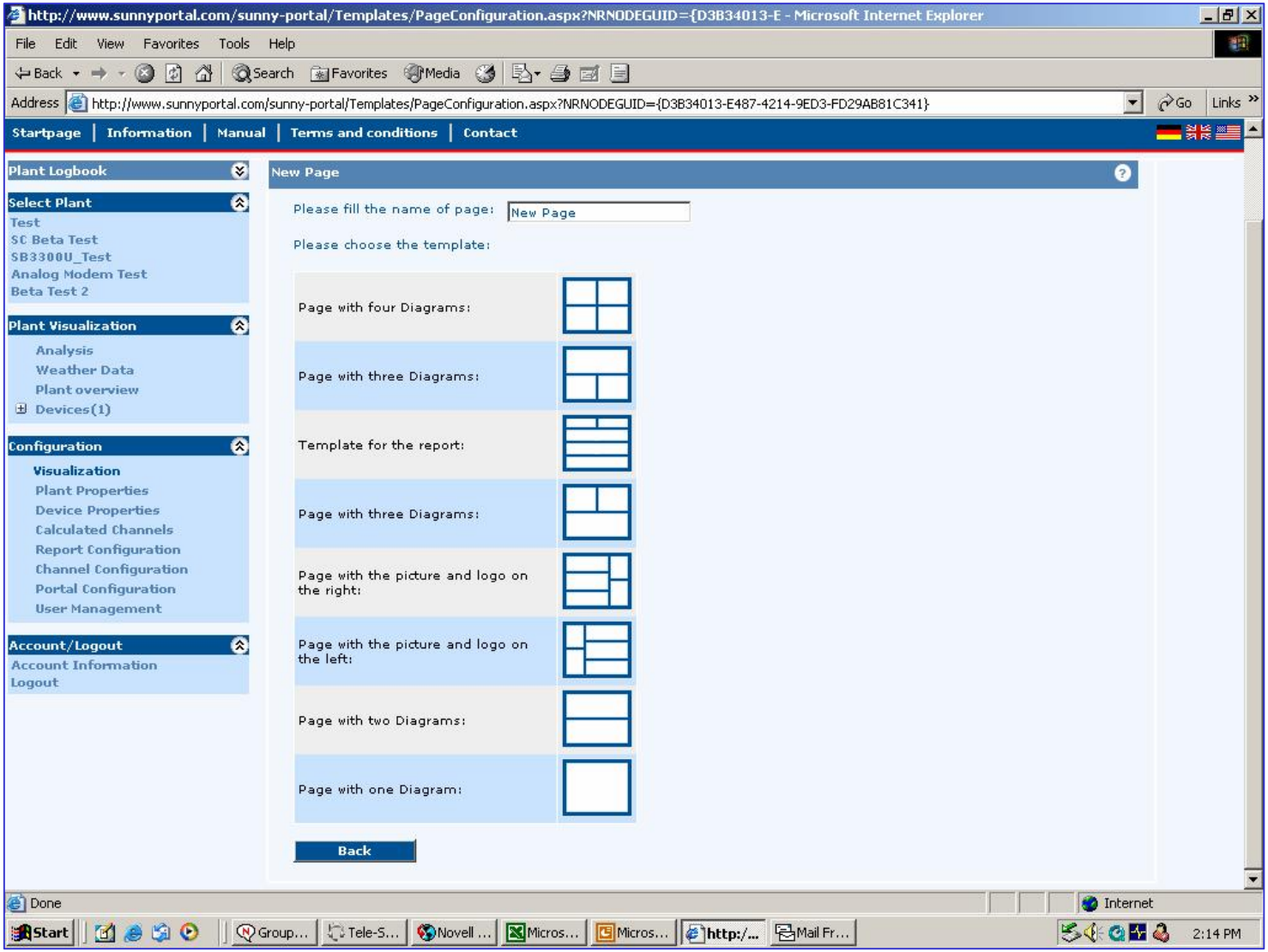
Sunny Portal Setup


http://www.sunnyportal.com/sunny-portal/Templates/Welcome.aspx?NRMODE=Published&NRORIGINALURL=/ - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.sunnyportal.com/sunny-portal/Templates/Welcome.aspx?NRMODE=Published&NRORIGINALURL=%2f&NRNODEGUID=%7b1DDAF4AB-7436-4A5E-9BCC-FFFBBE2
Go Links
SunnyPortal
Startpage | Information | Manual | Terms and conditions | Contact
Welcome
Login (SSL)
Publicly available plants
Example Plants
Data Visualization for Beginners & Professionals
Comfortable photovoltaic plant monitoring
SunnyPortal makes it possible to access and visualize your plant's operating data or energy yields via a safe internet connection - in real time and from any location in the world. Just log in on the home page to be informed on the current plant operation. Today mobility and communication around the globe are taken for granted. Why not using innovative communication structures also for remote PV plant monitoring? As a free web service by SMA, SunnyPortal offers you for example
the display of yields, power data and feed-in tariffs,
the automatic dispatch of status and failure reports via email on the PC, mobile phone or PDA.
Your Session is expired. Please login again.
Email:
Password:
Login
Internet
Start
4:54 PM

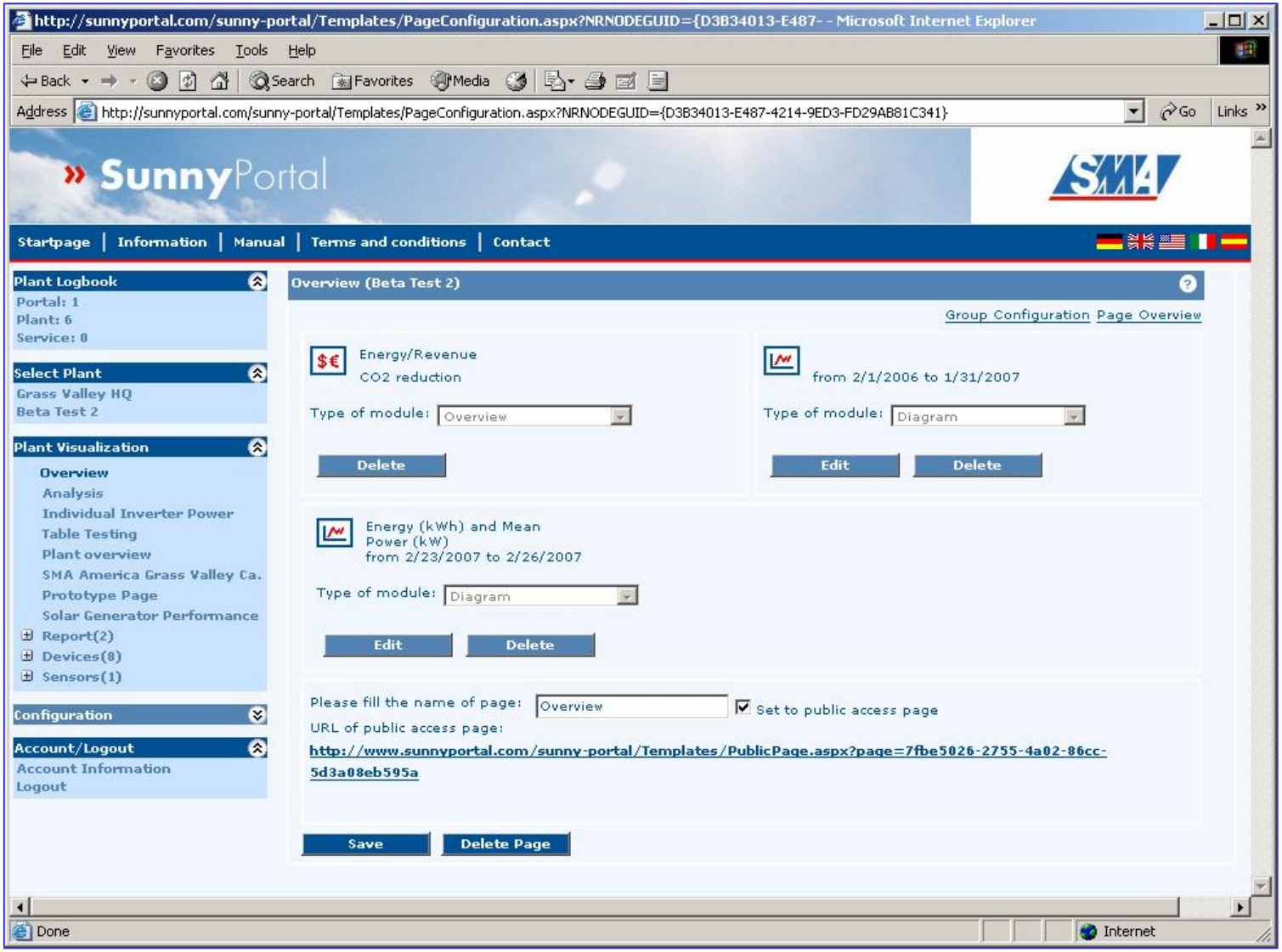
Sunny Portal Setup - Page Configuration



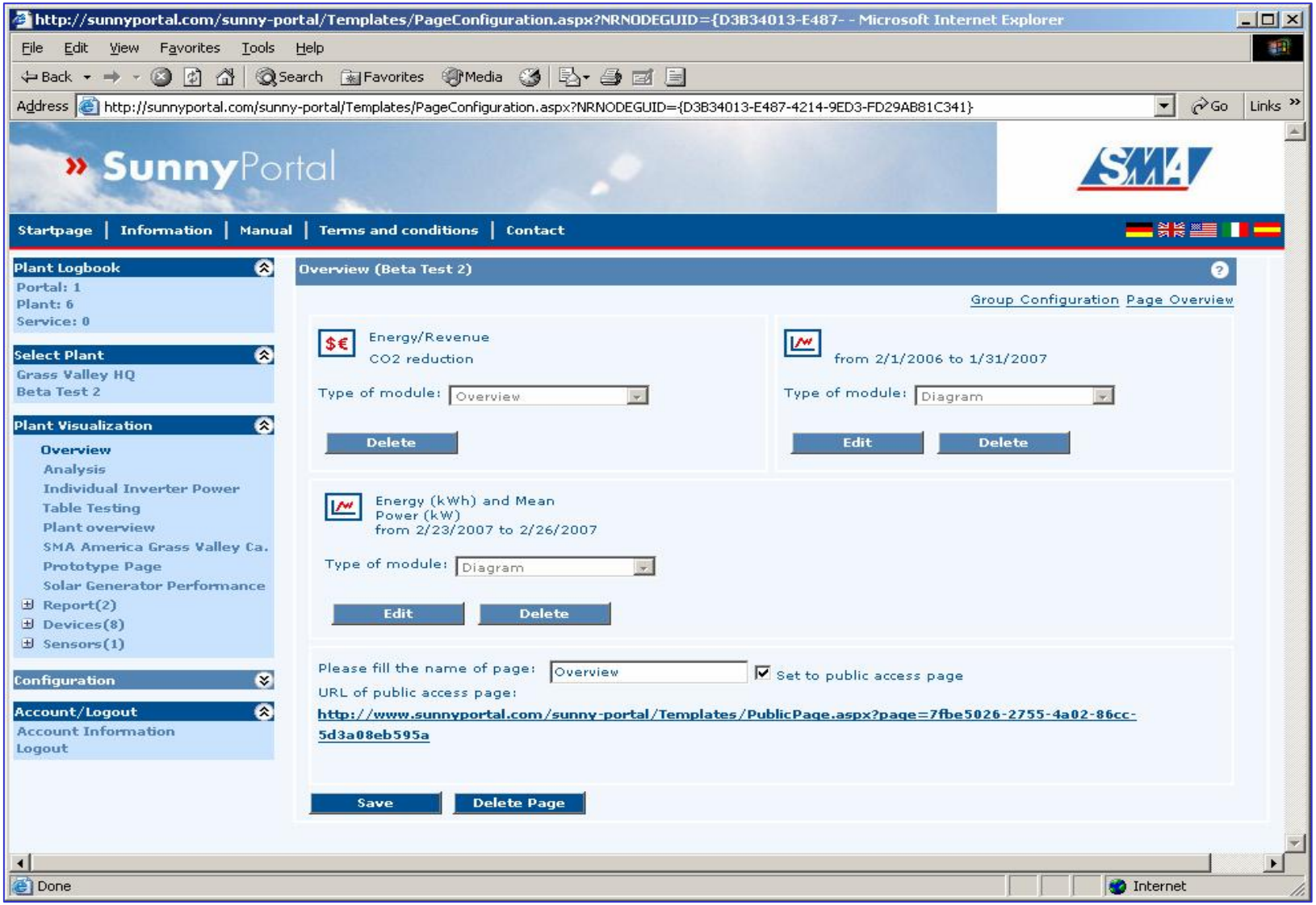
Sunny Portal Setup - Page Configuration-New Page



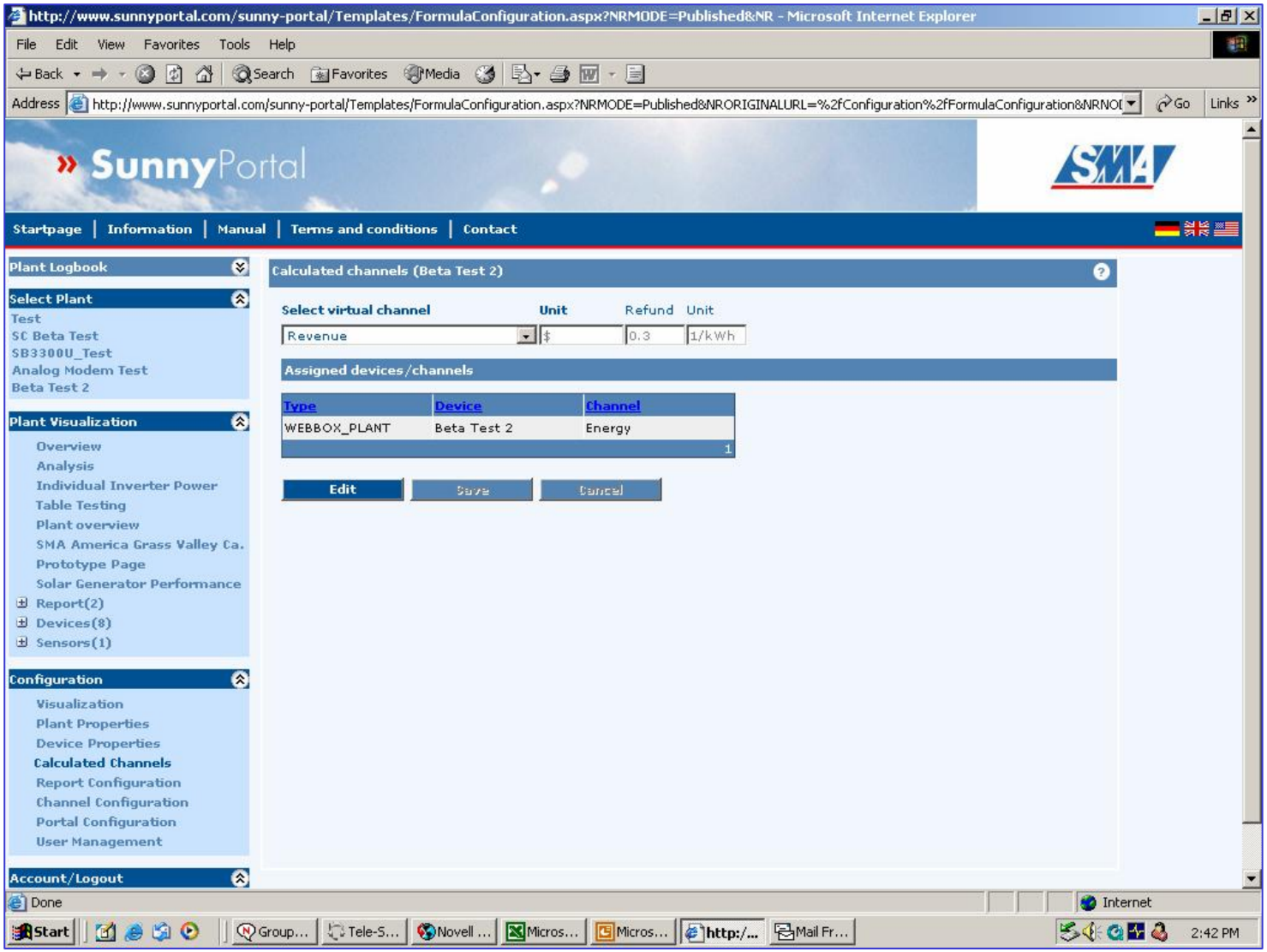
Sunny Portal Setup- Page Configuration-New Page



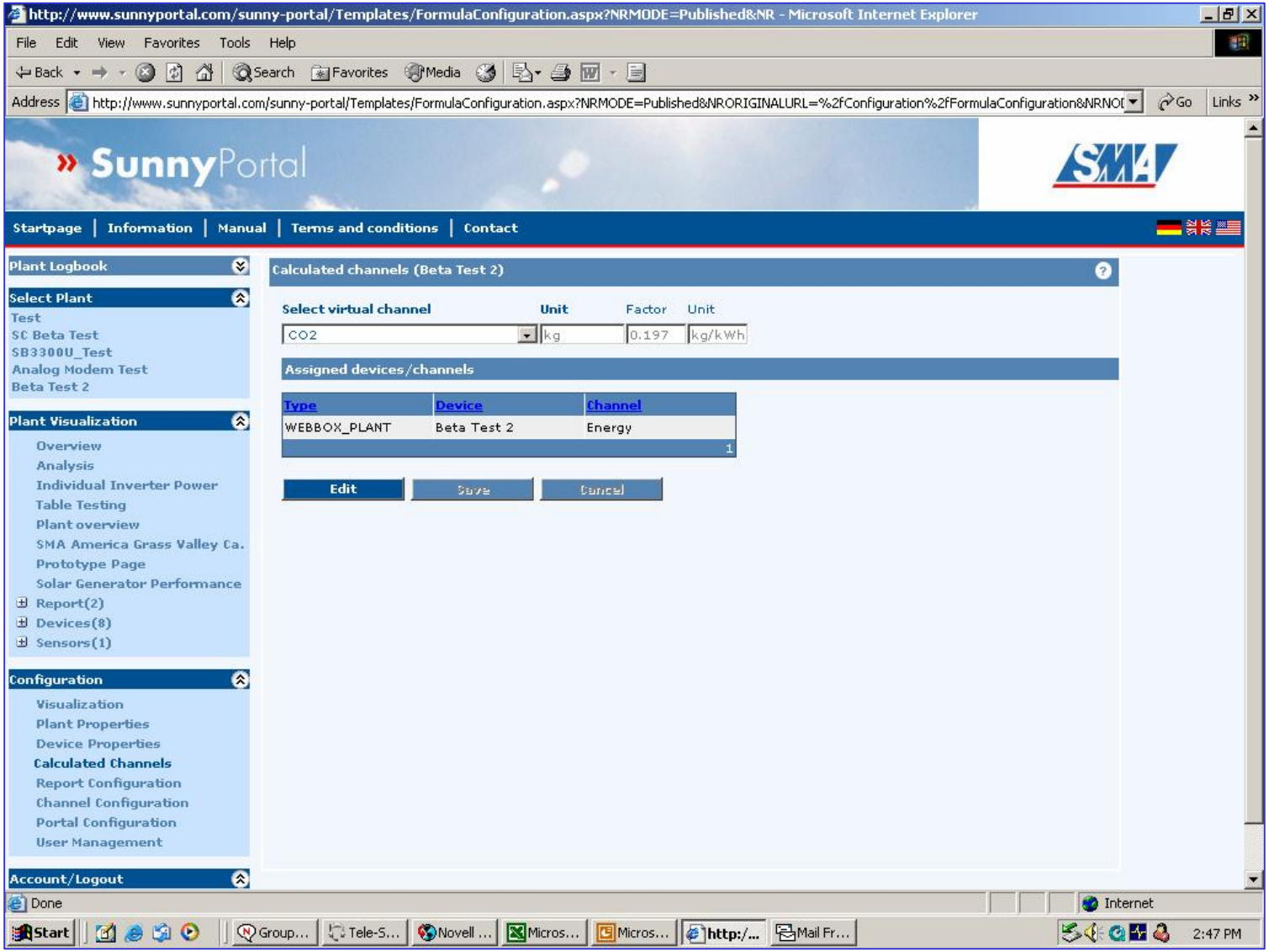
Sunny Portal Setup- Page Configuration-New Page



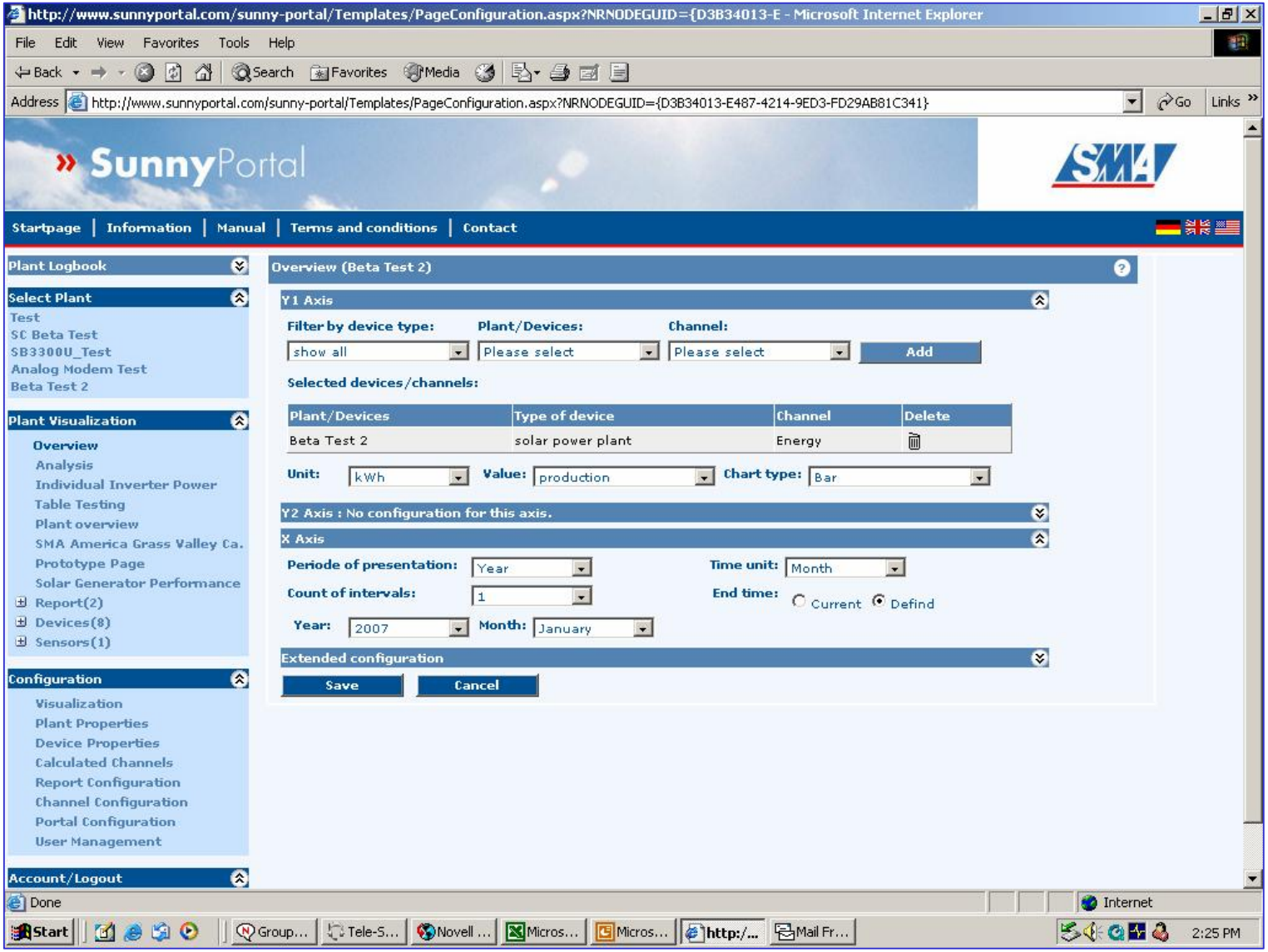
Page Configuration-Group Configuration



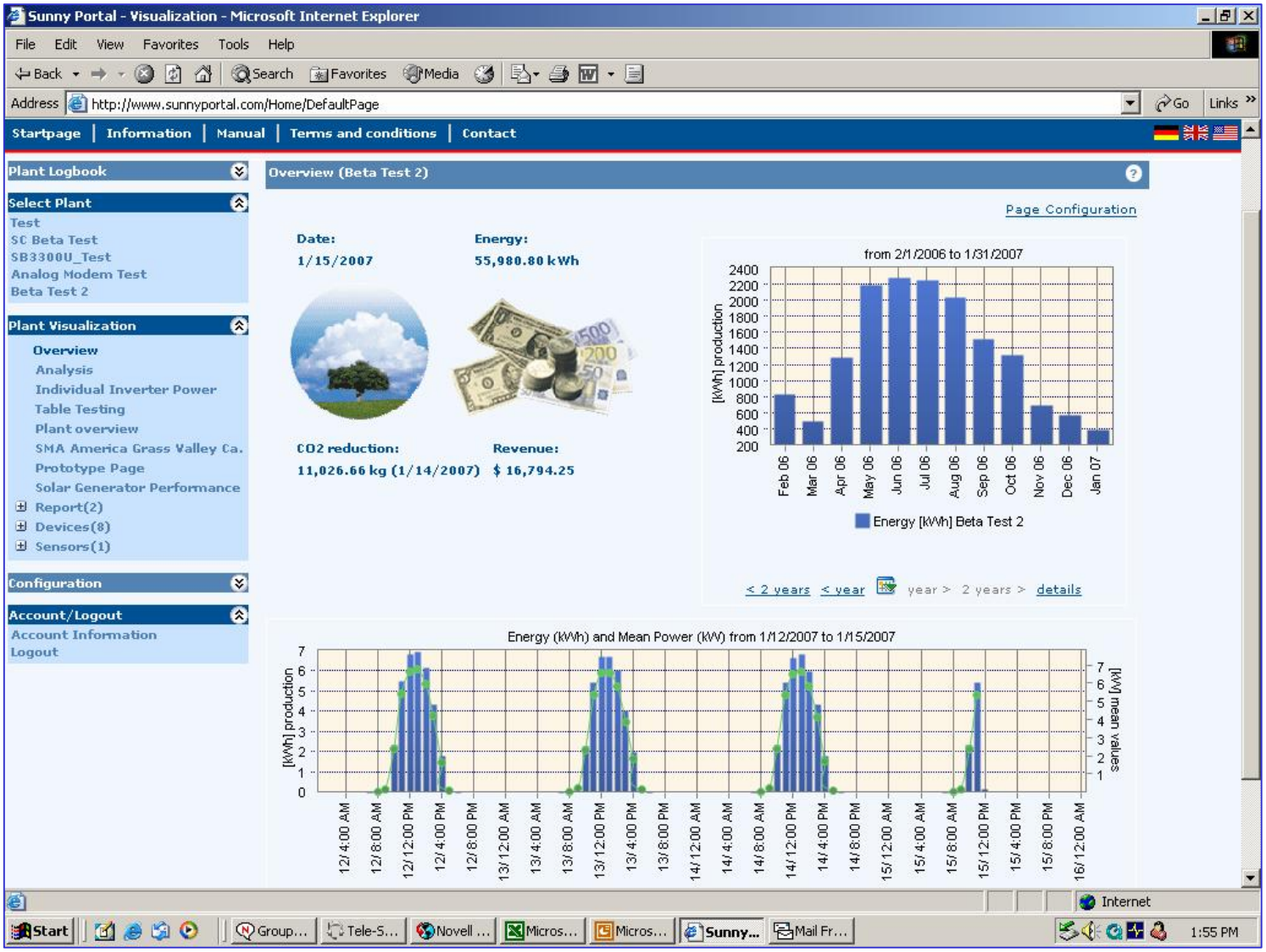
Page Configuration-Group Configuration



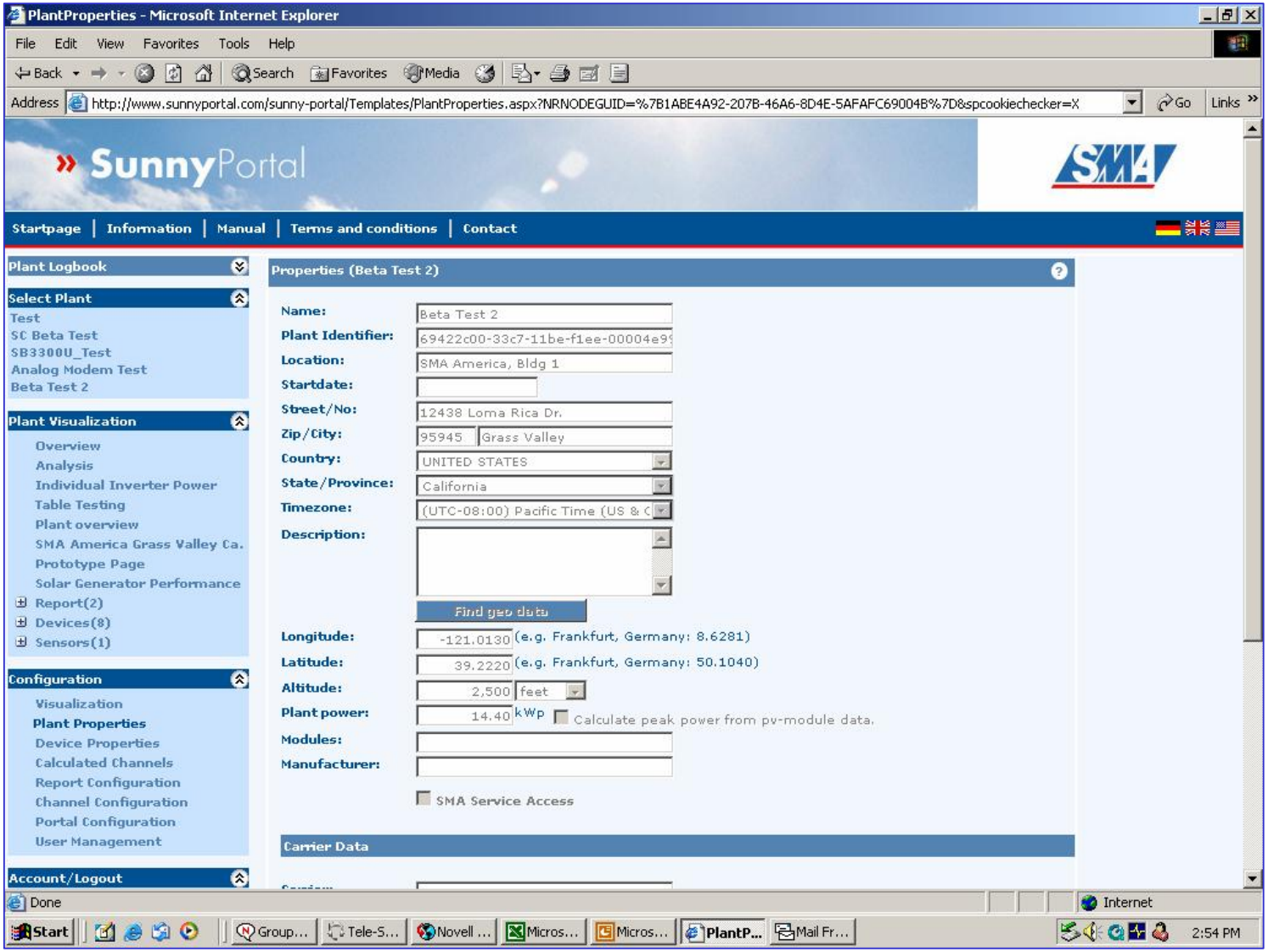
Page Configuration-Diagram Configuration



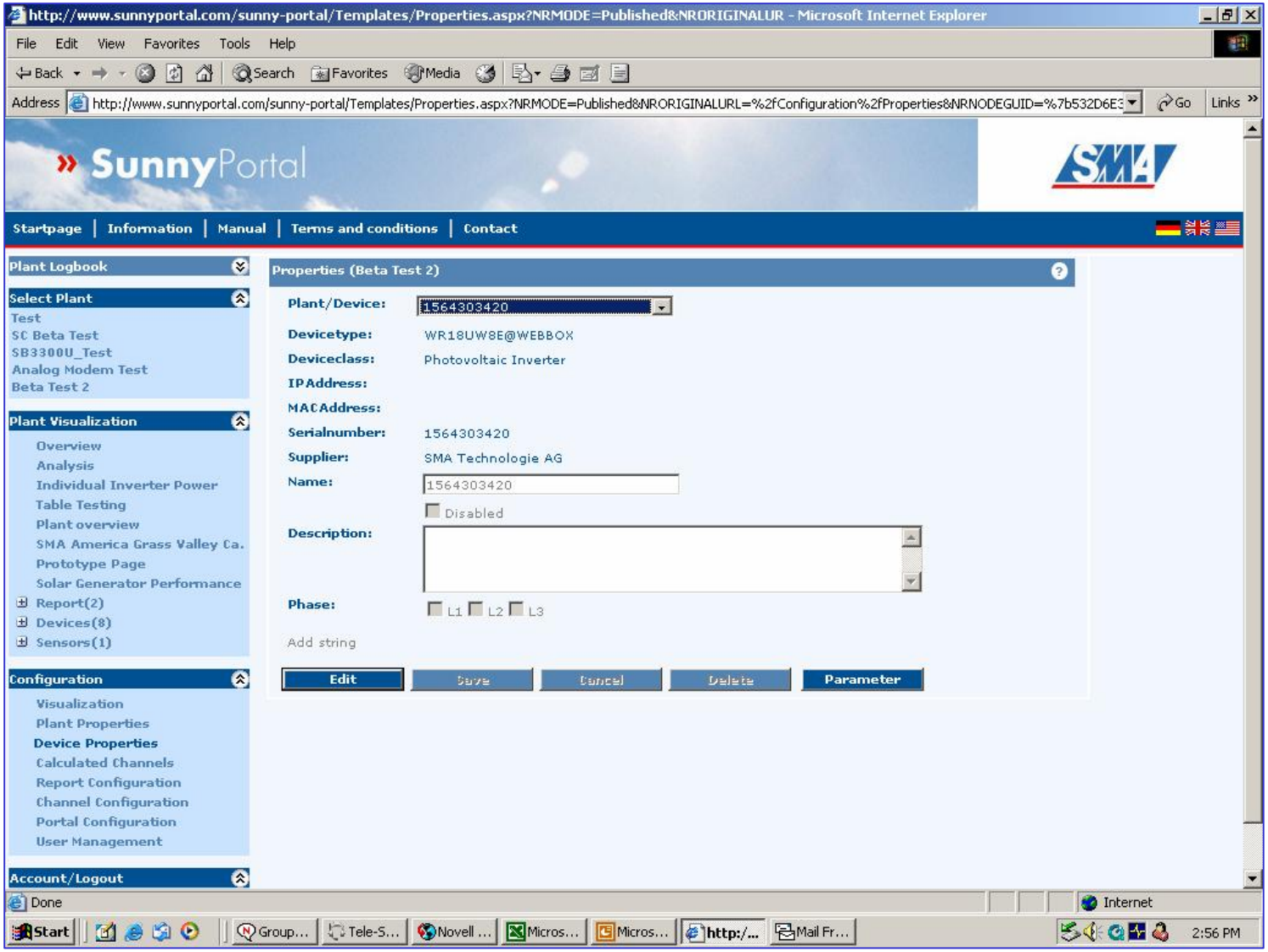
Sunny Portal Setup - Page Configuration-Page Overview



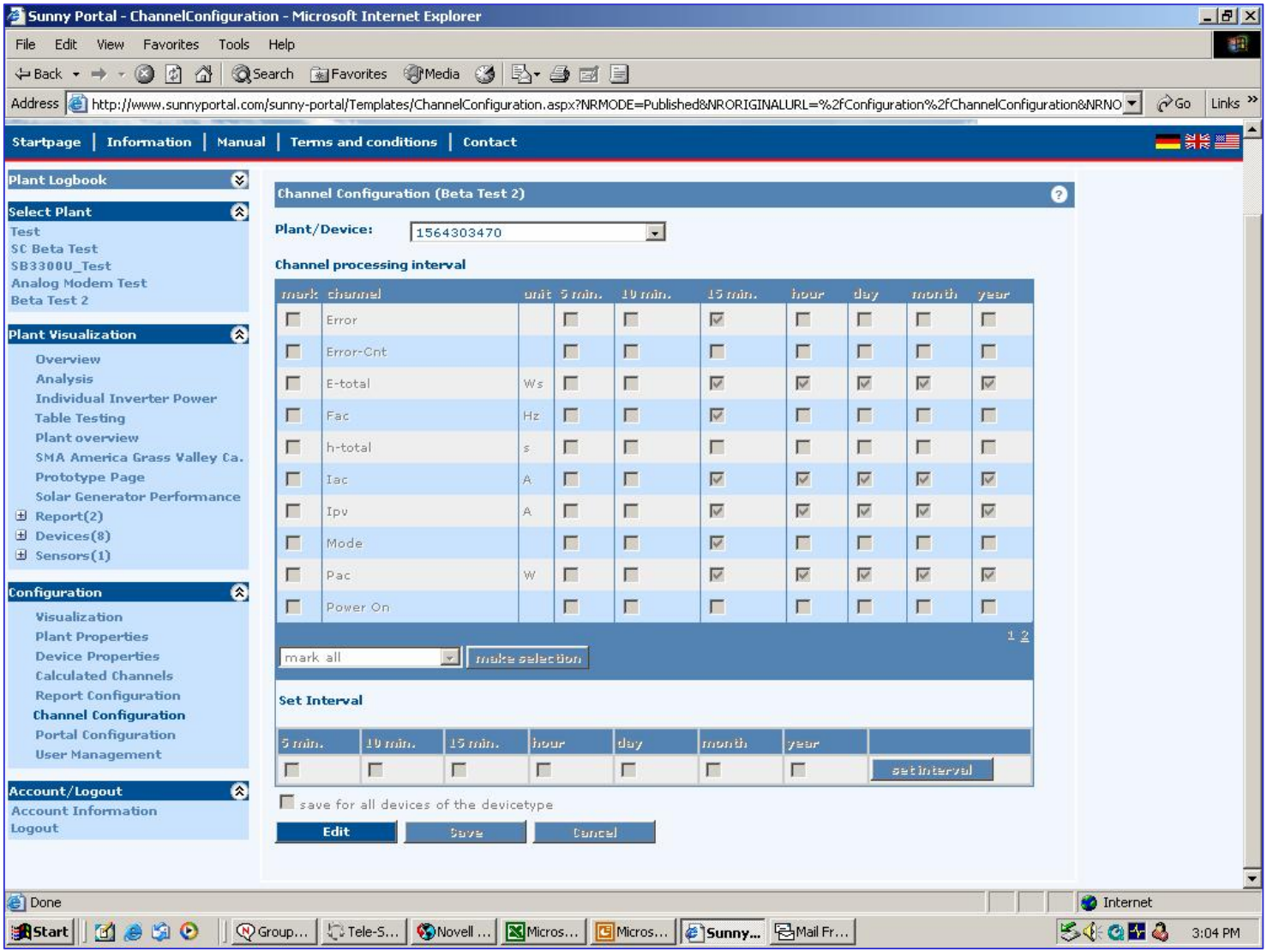
Page Configuration-Plant Properties



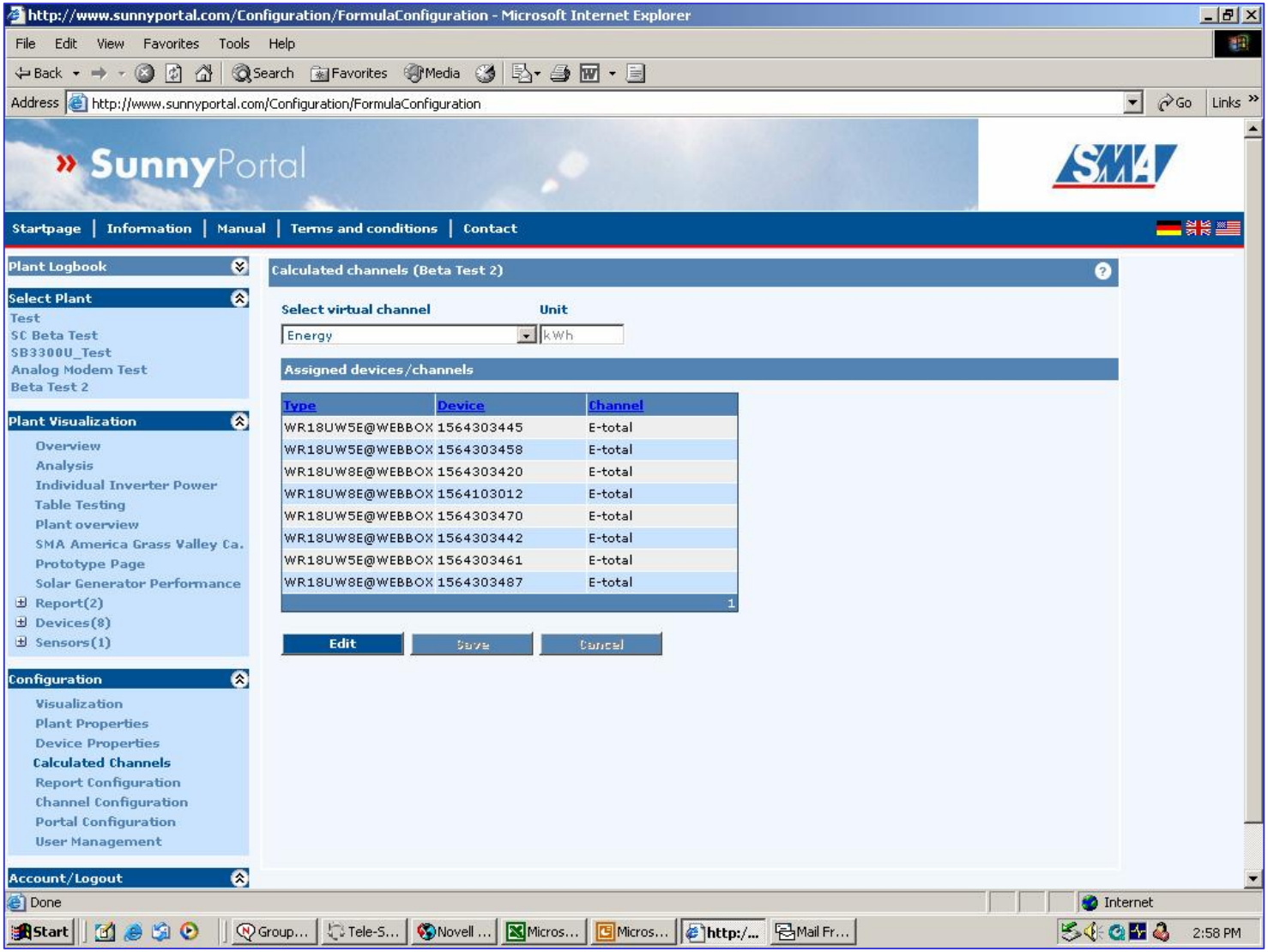
Page Configuration-Device Properties



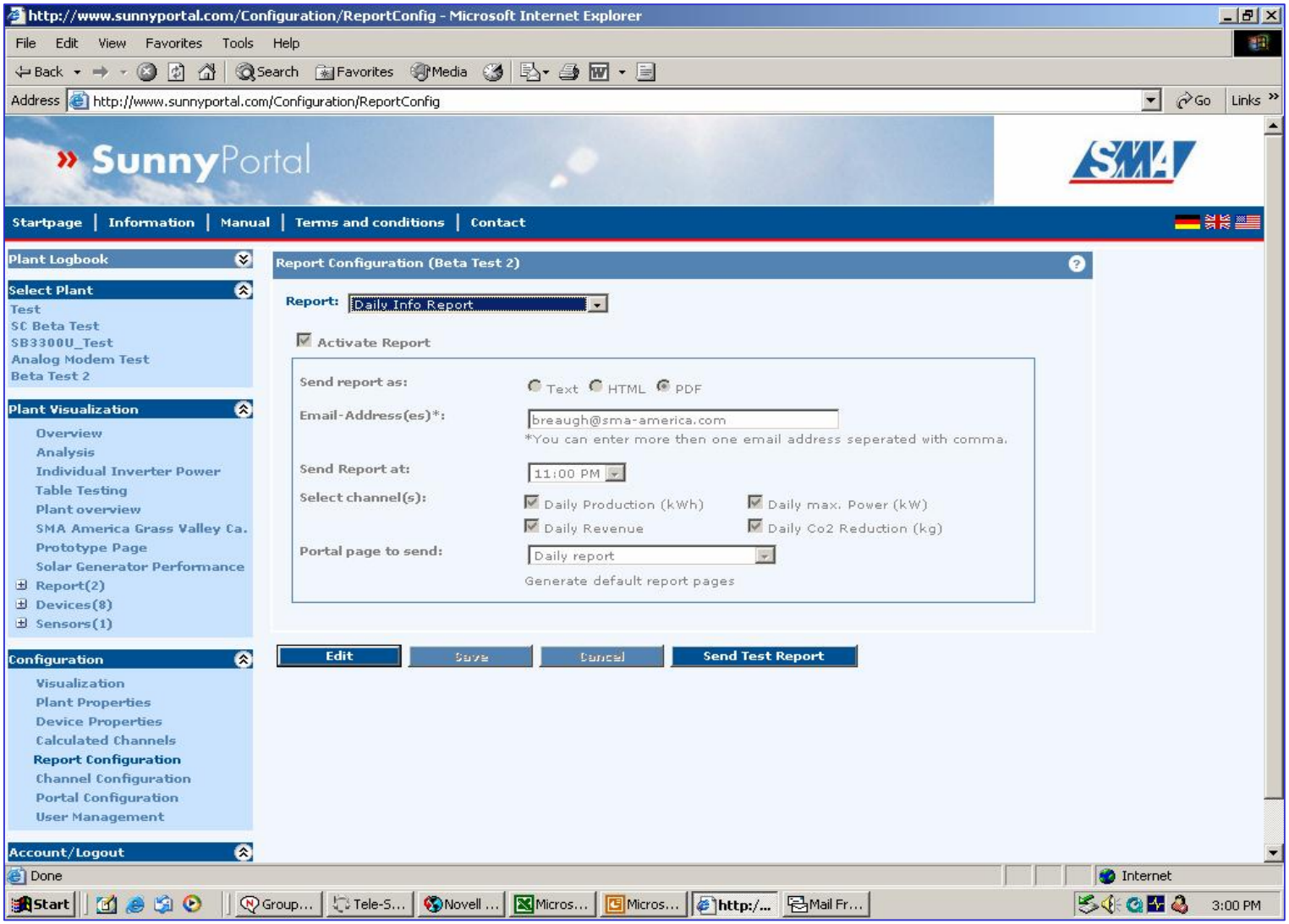
Page Configuration-Channel Configuration



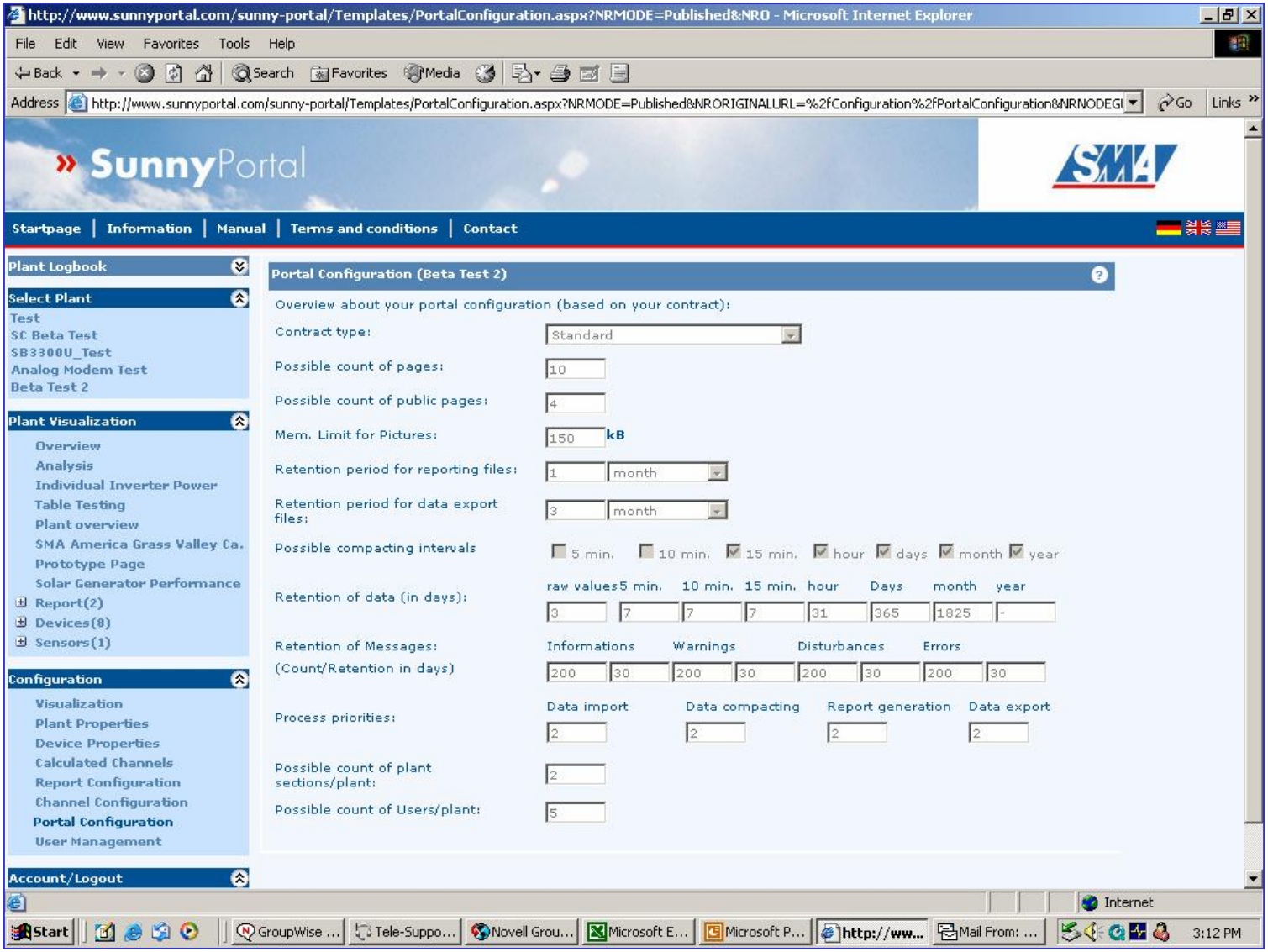
Page Configuration-Calculated Channels



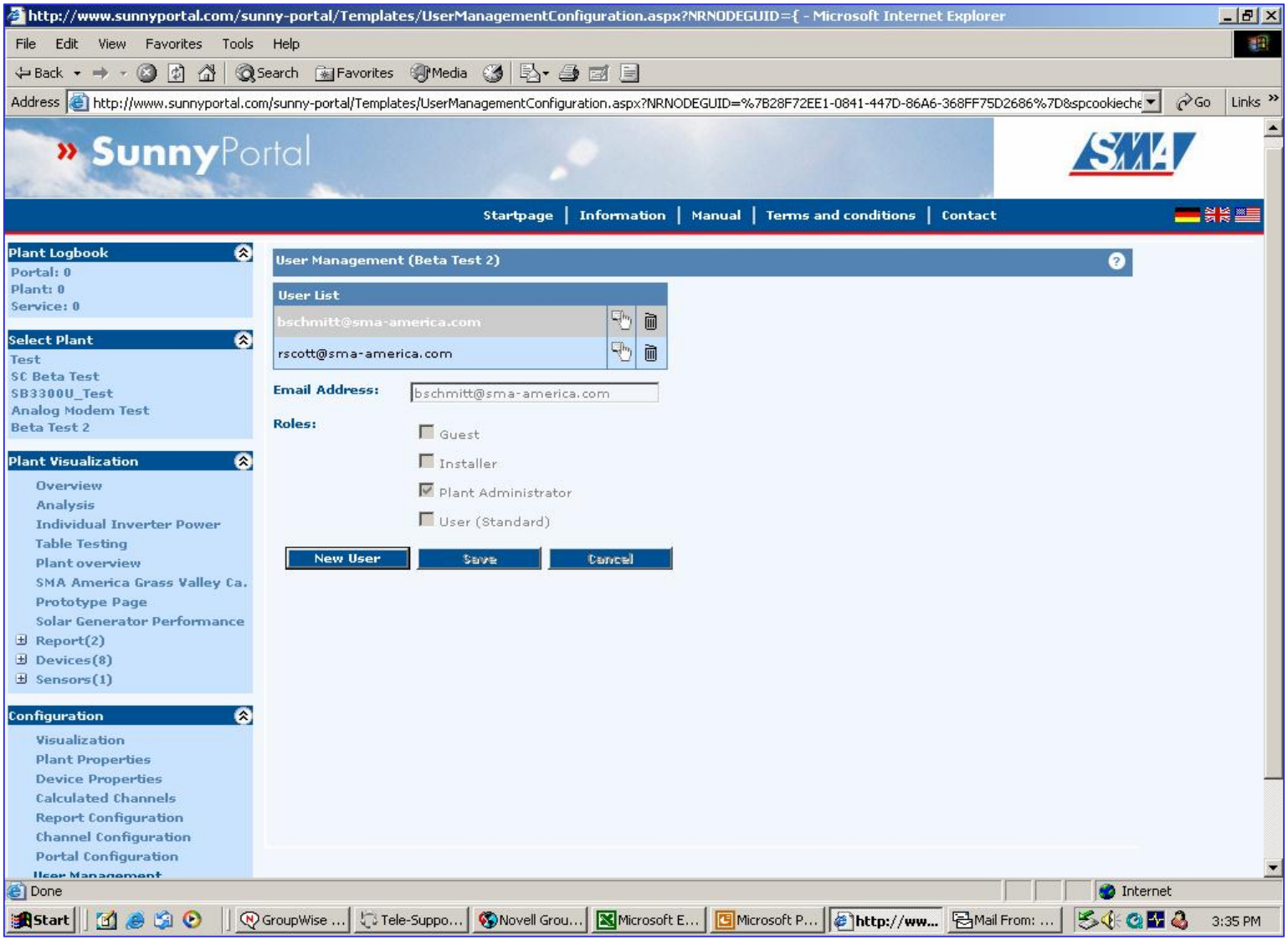
Page Configuration-Report Configuration



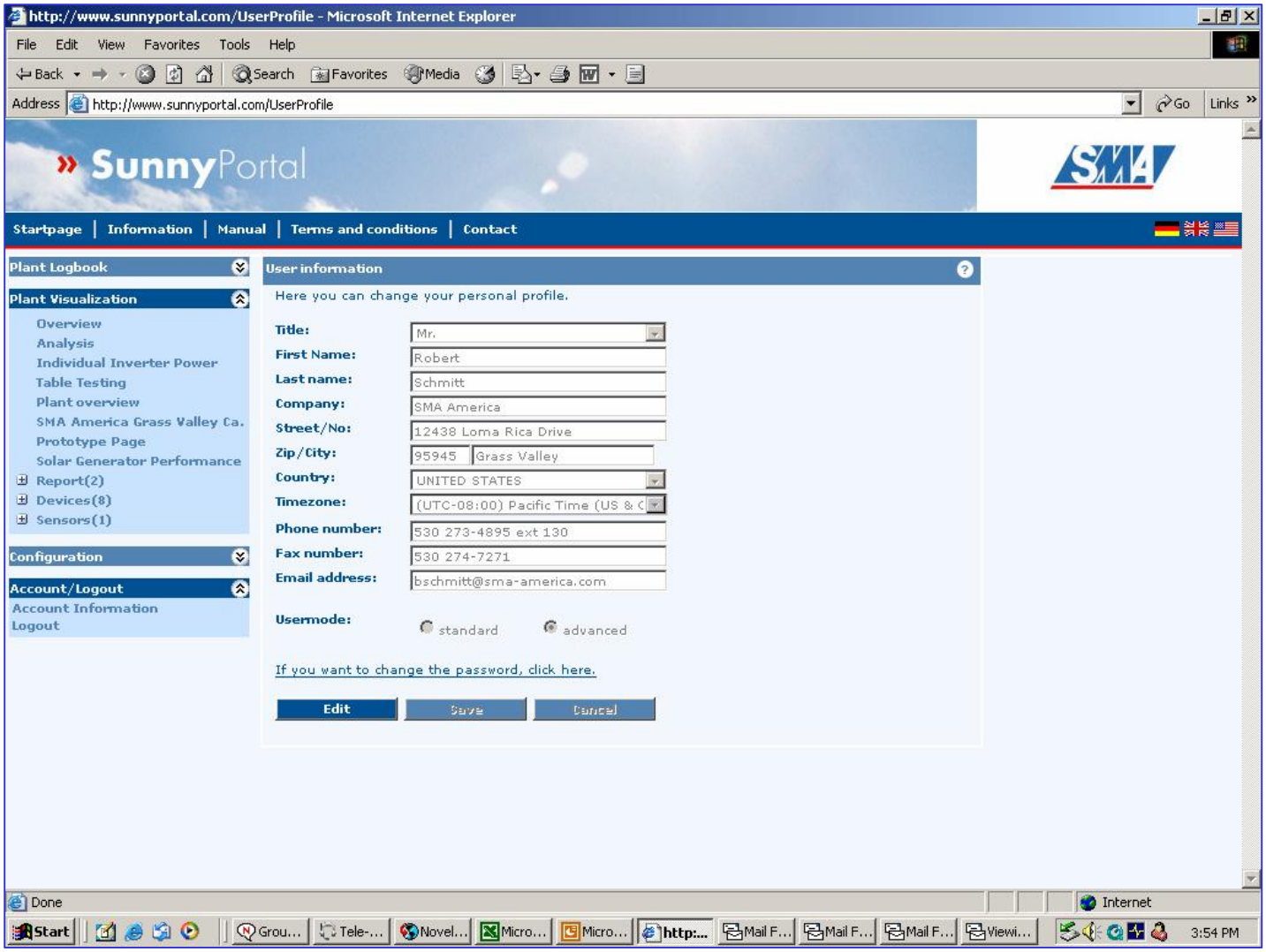
Page Configuration-Portal Configuration


http://www.sunnyportal.com/sunny-portal/Templates/PortalConfiguration.aspx?NRMODE=Published&NRO - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://www.sunnyportal.com/sunny-portal/Templates/PortalConfiguration.aspx?NRMODE=Published&NRORIGINALURL=%2fConfiguration%2fPortalConfiguration&NRNODEGU
Go Links
SunnyPortal
Startpage | Information | Manual | Terms and conditions | Contact
Plant Logbook
Select Plant
Test
SC Beta Test
SB3300U_Test
Analog Modem Test
Beta Test 2
Plant Visualization
Overview
Analysis
Individual Inverter Power
Table Testing
Plant overview
SMA America Grass Valley Ca.
Prototype Page
Solar Generator Performance
Report(2)
Devices(8)
Sensors(1)
Configuration
Visualization
Plant Properties
Device Properties
Calculated Channels
Report Configuration
Channel Configuration
Portal Configuration
User Management
Account/Logout
Portal Configuration (Beta Test 2)
Overview about your portal configuration (based on your contract):
Contract type: Standard
Possible count of pages: 10
Possible count of public pages: 4
Mem. Limit for Pictures: 150 kB
Retention period for reporting files: 1 month
Retention period for data export files: 3 month
Possible compacting intervals: 5 min. 10 min. 15 min. hour days month year
Retention of data (in days): raw values 5 min. 10 min. 15 min. hour Days month year
3 7 7 7 31 365 1825 -
Retention of Messages: (Count/Retention in days) Informations Warnings Disturbances Errors
200 30 200 30 200 30 200 30
Process priorities: Data import Data compacting Report generation Data export
2 2 2 2
Possible count of plant sections/plant: 2
Possible count of Users/plant: 5
Internet
Start GroupWise ... Tele-Suppo... Novell Grou... Microsoft E... Microsoft P... http://ww... Mail From: ... 3:12 PM

Page Configuration-User Management



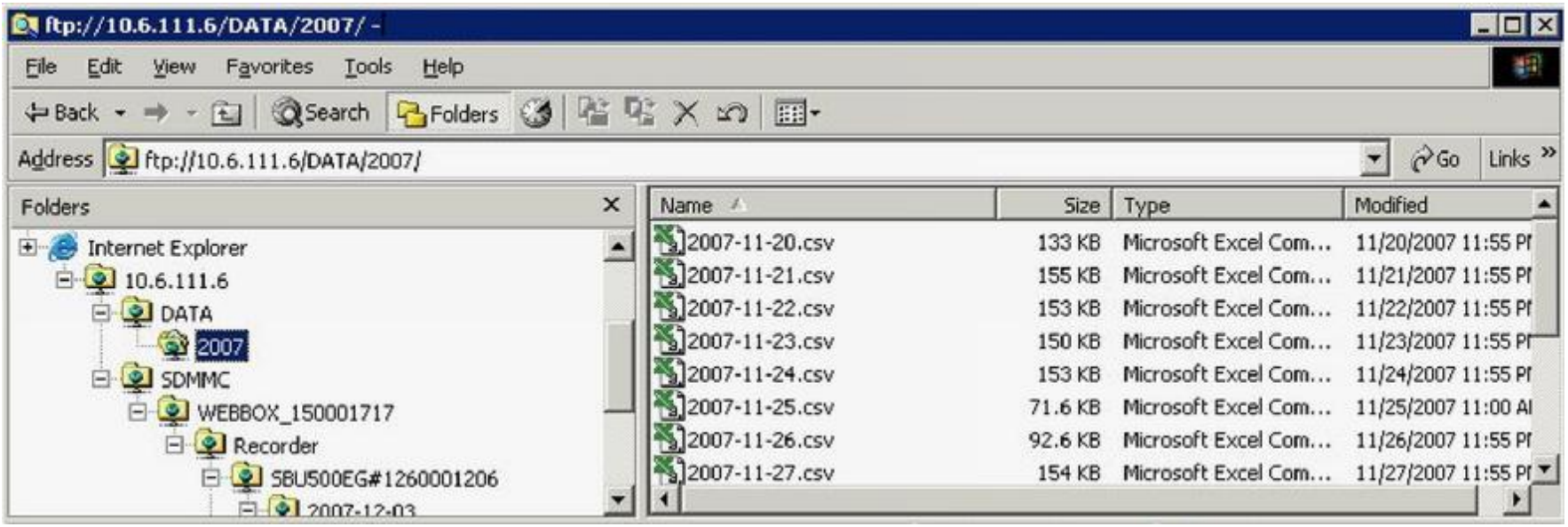
Page Configuration-User Information



Initial Start-up

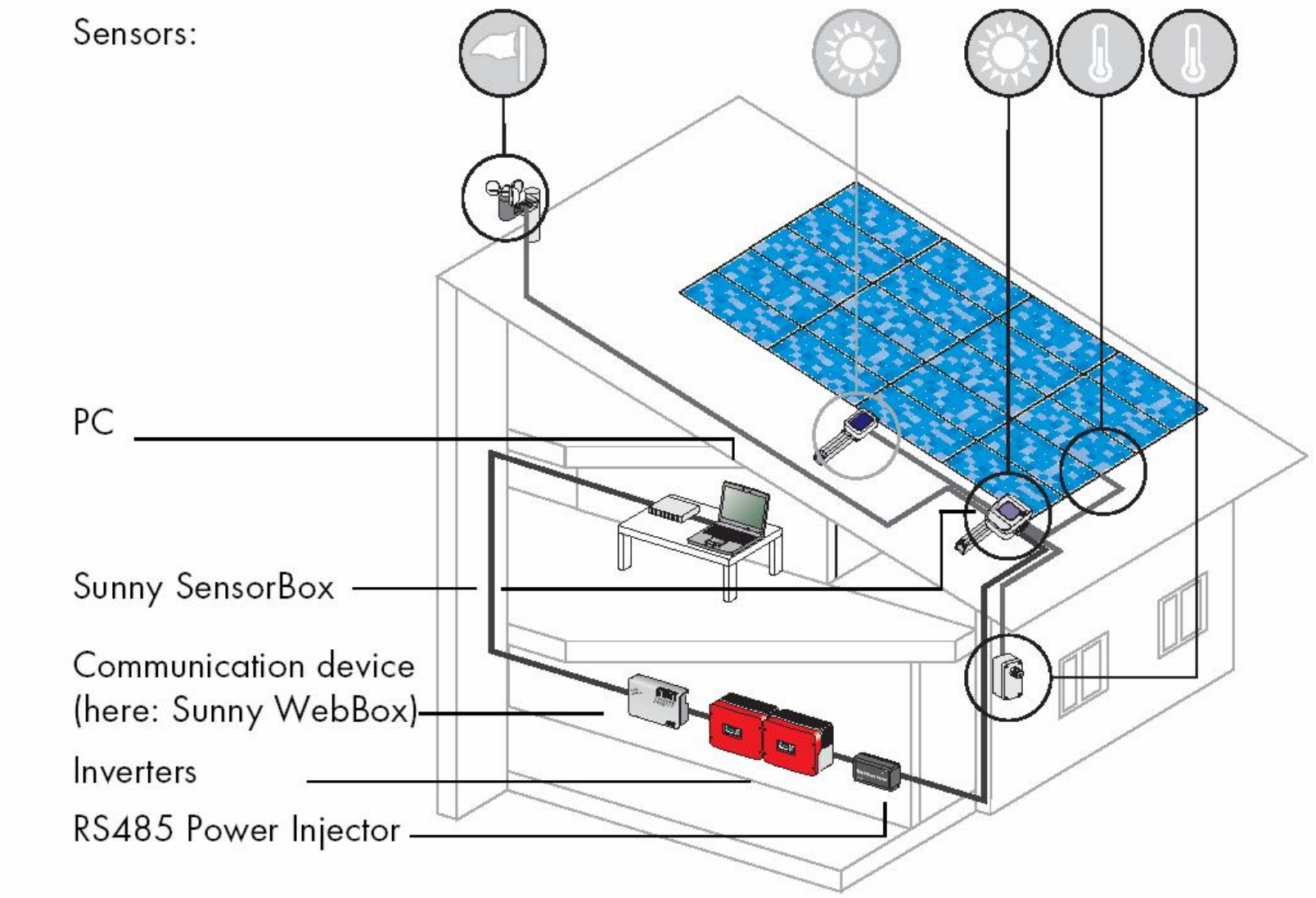
The Sunny WebBox FTP Server

- The FTP folder contains up to 8 MB of internally stored data
- If the memory is expanded using an SD card, the folder contains the data on the memory card

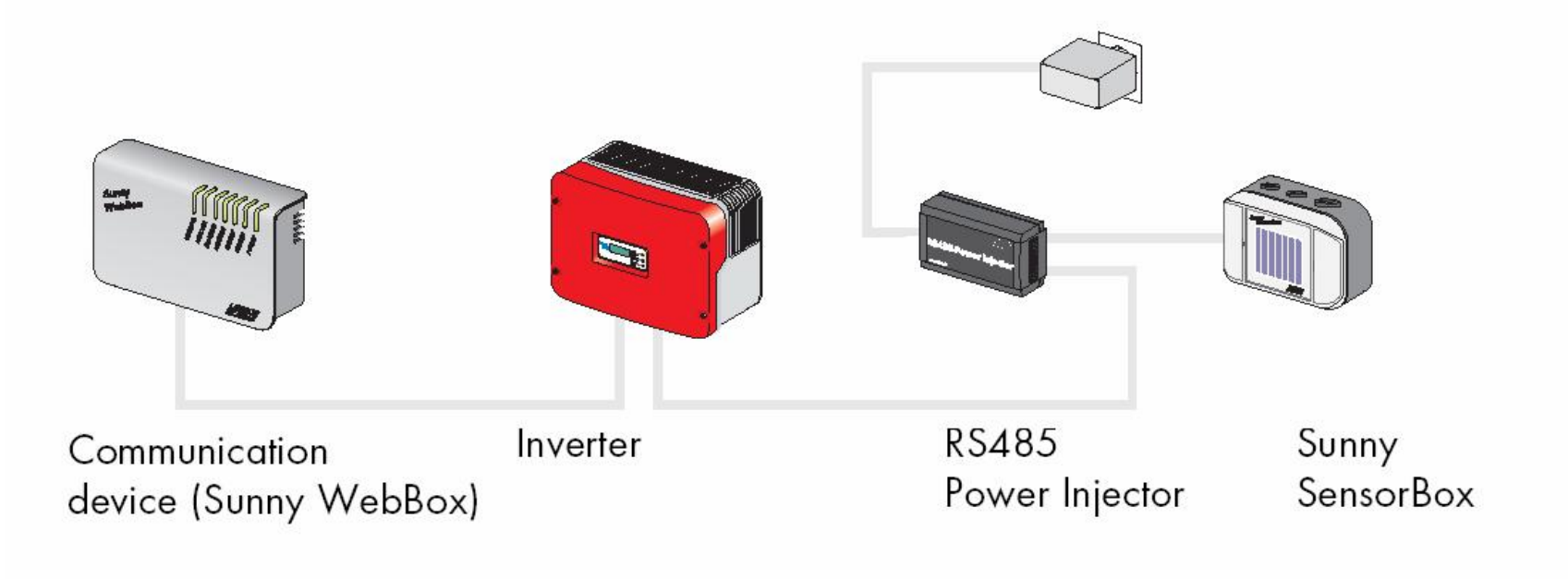

ftp://10.6.111.6/DATA/2007/ -
File Edit View Favorites Tools Help
Back Search Folders
Address ftp://10.6.111.6/DATA/2007/
Go Links
Folders
Internet Explorer
10.6.111.6
DATA
2007
SDMMC
WEBBOX_150001717
Recorder
SBU500EG#1260001206
2007-12-03
Name Size Type Modified
2007-11-20.csv 133 KB Microsoft Excel Com... 11/20/2007 11:55 PM
2007-11-21.csv 155 KB Microsoft Excel Com... 11/21/2007 11:55 PM
2007-11-22.csv 153 KB Microsoft Excel Com... 11/22/2007 11:55 PM
2007-11-23.csv 150 KB Microsoft Excel Com... 11/23/2007 11:55 PM
2007-11-24.csv 153 KB Microsoft Excel Com... 11/24/2007 11:55 PM
2007-11-25.csv 71.6 KB Microsoft Excel Com... 11/25/2007 11:00 AM
2007-11-26.csv 92.6 KB Microsoft Excel Com... 11/26/2007 11:55 PM
2007-11-27.csv 154 KB Microsoft Excel Com... 11/27/2007 11:55 PM

Sunny SensorBox

Sunny SensorBox



Sunny SensorBox



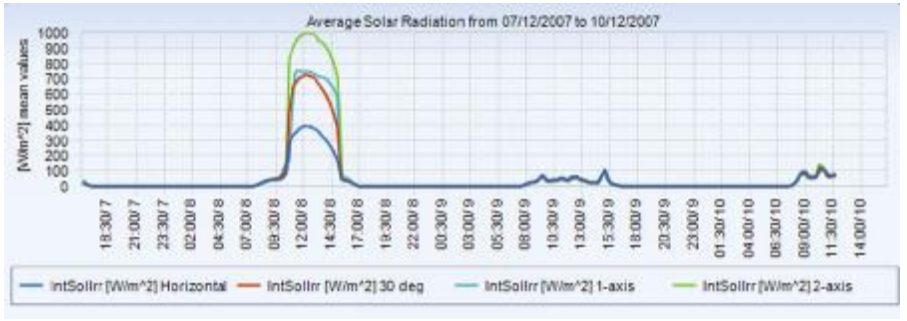
- Wiring diagrams of the sensor box

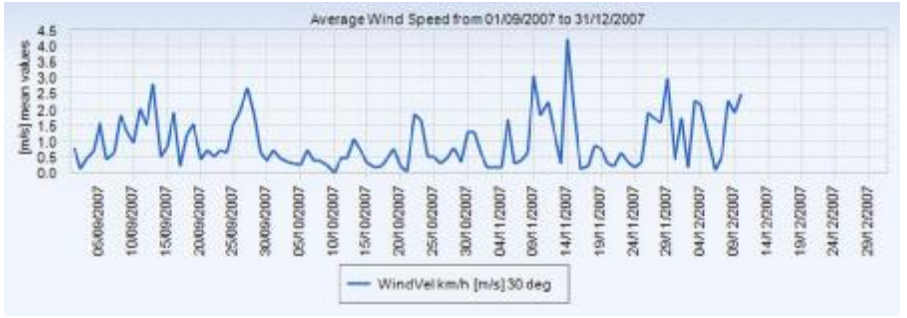
Sunny SensorBox

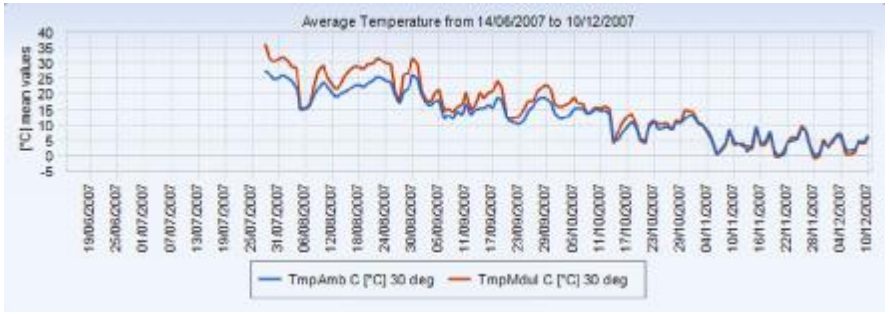
- Max. 150 m of cable between the Power Injector and the Sunny SensorBox
- Max. 30 m of cable between the external sensors and the Sunny SensorBox
- Max. 1200 m of cable for the entire RS485 bus (EIA485 bus)
- Max. 5 Sunny SensorBox devices with one Power Injector
- From the rear, adhere the module temperature sensor to a PV module
- Install the Sunny SensorBox so that it has the identical orientation as the modules
- Keep the reference cell out of shaded areas

Sunny SensorBox in Sunny Portal

- Radiation sensor
  - External
  - Internal
- Anemometer
- Temperature sensor
  - Surrounding area (blue)
  - Module (red)







Thank you